Department of Energy
Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
P.O. Box 30307
North Las Vegas, NV 89036-0307

QA: N/A

MAY 18 2000

G. E. Dials
President and General Manager
TRW Environmental Safety Systems, Inc.
1211 Town Center Drive, M/S 423
Las Vegas, NV 89144

SUPPLEMENTAL GUIDANCE FOR THE FISCAL YEAR (FY) 2001 GUIDANCE FOR THE ANNUAL UPDATE TO THE MULTI-YEAR PLAN

This letter contains clarification of the FY 2001 planning process and provides additional guidance that wasn't available when the initial guidance was issued. The contents of this letter address the budget available to the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O) and the U.S. Geological Survey (USGS) in the Mid-case funding scenario and responses to the 12 questions you asked in your April 14, 2000 letter regarding the initial guidance. Enclosures to this letter contain new set-aside tables for the three funding scenarios, the draft planning Project Summary Schedule (PSS) Milestone Description Sheets for the Mid-case funding scenario, and the product-oriented U.S. Department of Energy (DOE) Work Breakdown Structure (WBS) Dictionary. Also enclosed is guidance for an additional Systems Study to be implemented that could lead to recommendations of approaches that may be taken to reduce the calculated potential peak dose rate.

Planning Budgets for the Mid-case and Level funding scenarios:

The $380M Mid-case funding level has been increased to $395M and the amount of management reserve in the set-aside table has been reduced to $7M. For planning, the CRWMS M&O should use a budget of $219.8M for the CRWMS M&O and USGS for FY 2001 for the Mid-case funding scenario ($395M). A revised Mid-case funding distribution table is enclosed. The planning budget for the Level Funding scenario ($350M) has also been changed from that provided in the initial planning guidance; a new set-aside table is enclosed. The safeguards and securities budget of $6.9M is in addition to the amount shown in the funding distribution tables. The planning budget numbers will need to be adjusted to the actual FY 2001 congressional budget appropriation.

Question 1:

The letter is clear that the Integrated Project Schedule (IPS) will be updated based on the Mid-case funding scenario ($380M). The CRWMS M&O assumes that all other planning documents (Statements of Work, Rough Order of Magnitude Estimates [ROM], detail estimates, prioritization, etc.) will be provided for the Mid-case funding level ($380M) only. A PSS with a listing of work scope differences will be provided in support of the Program Plan case ($437M) and the Level Funding case ($350M). If this is not sufficient for the Program Plan and Level Funding cases, please provide further instructions.

Response 1:

In step 1 of the two-step planning process DOE is requesting an evaluation of all CRWMS M&O and USGS work scope defined in the Planning Guidance for FY 2001 using the prioritization matrix which was included in the guidance. The documentation should include the prioritization of all work. The CRWMS M&O is to use the prioritization values as part of the basis for recommending the work scope to be performed in FY 2001. The documentation for the recommended work scope should include the prioritization (or other justification if necessary work would be omitted due to the prioritization process) of the work the CRWMS M&O recommends to be funded at the $395M level. The CRWMS M&O should also provide documentation for the work that would be added or subtracted at the other two funding levels. The documentation of additions and subtractions should include the prioritization, a brief work scope description, and a ROM for each work item.

Question 2:

The CRWMS M&O's understanding of the guidance is that detailed planning is required through submittal of the License Application (LA). As a result, no planning packages or detail IPS activities are required to be developed/estimated beyond LA. Planning beyond LA will be represented in the PSS only. The CRWMS M&O plans to prioritize all work identified to be performed by the CRWMS M&O in the plan. In addition, the CRWMS M&O will work with the USGS to prioritize similar and supporting work in a consistent manner. Since the CRWMS M&O is not privy to the work scope and planning guidance provided to the project set-aside and program direction functions, DOE will have to prioritize this work scope.

Response 2:

The CRWMS M&O's understanding is correct; the detailed plan, step 2 of the planning process, should only contain planning through the submittal of the LA.

The USGS work scope should be integrated with the CRWMS M&O work scope prior to prioritization. DOE will prioritize the project set-aside and program direction functions.

The CRWMS M&O is to include the USGS work scope, along with the CRWMS M&O work scope, in the prioritization process. DOE will do the prioritization of the set-asides and support services contractors.

Question 3:

Is there an expected deliverable associated with the requirement for resource planning? The CRWMS M&O assumes this information will be provided as backup on an as-needed basis.

Response 3:

The CRWMS M&O's assumption is correct. The plan developed by the CRWMS M&O should not preclude developing resource information in a timely manner.

Question 4:

When can the CRWMS M&O expect guidance for the Quality Assurance Technical Services Support (QATSS) effort? Will this guidance include breakout of funding by fiscal year?

Response 4:

For planning purposes the entire QATSS's work scope until Feb 11, 2001, is in the 8-leg of the WBS and is funded from the Program Direction set-aside. After Feb 11, 2001, the Quality Engineering and Field Quality Control activities will transition from QATSS to the new CRWMS M&O contractor. The funding for the remaining QATSS activities after Feb 11, 2001, is also included in the Program Direction set-aside and will be planned in the 8-leg of the WBS. Planning guidance for QATSS's activities will be developed and sent to QATSS by the Office of Quality Assurance. The funding for the transitioned Quality Engineering and Field Quality Control for FY 2001 and the out-years is identified in the new set-aside tables enclosed with this letter. The Office of Quality Assurance will send planning guidance to the new M&O for these activities. The new CRWMS M&O's quality assurance activities will be entered separately into the 8-leg of the WBS.

Question 5:

Has any funding been set aside for contract closeout costs?

Response 5:

No funding has been set aside for the contract closeout costs. The CRWMS M&O should provide an estimate of their expected closeout costs to the Contracting Officer before the Step-1 deliverable is delivered to DOE so that necessary funds can be identified and set aside for this effort.

Question 6:

Is there any budget for the QATSS in the CRWMS M&O "Total budget Available for Planning" ($196.8M)?

Response 6:

See response 4.

Question 7:

Regarding Safeguards and Security, the CRWMS M&O does not have contractual access to the necessary National Laboratory or Wackenhut Services, Inc. (WSI), Inc. burden rates to ensure that lab and WSI estimates for FY 2001 exclude these costs. Will the DOE provide the necessary information in supplemental guidance?

Response 7:

During the OCRWM Senior Management Planning Workshop the second week of April 2000, RW-2 explained to the National Laboratory Leads that their total funding from OCRWM would be less the amount taken for Safeguards and Securities. Present from the Laboratories were Margaret Chu (Sandia National Laboratories), Mike Baker (Los Alamos National Laboratory), Terry Surles (Lawrence Livermore National Laboratory), and Bo Bodvarsson (Lawrence Berkeley National Laboratory). DOE will notify WSI that their entire budget will be from the Office of Security and Emergency Operations (OSEO) funding.

Question 8:

Regarding Safeguard and Security effort for TRW Environmental Safety Systems, Inc. (TRW), the CRWMS M&O proposes to include the TRW portion of this budget in the

CRWMS M&O baseline so that it can be properly tracked. (This is similar to the manner in which the CRWMS M&O tracks and monitors the separately funded Spent Nuclear Fuel effort.) The TRW Safeguards and Security effort is described in the detail guidance under WBS 1.2.21.6.1 Administration. Should this work scope be deleted from the planning process? If so, when will further guidance from OSEO be made available? Also, will funding from OSEO for the TRW effort appear on the Approved Funding Program?

Response 8:

These are good questions but the issues have not been yet resolved within DOE. Answers to these questions will be included in the final guidance.

Question 9:

Regarding Safeguards and Security, the CRWMS M&O does not have contractual access to the necessary information to identify and track this work at the National Laboratories or WSI. What are the expectations regarding the M&O identifying and tracking this work as is stated in the guidance?

Response 9:

See Response 8.

Question 10:

The CRWMS M&O is planning on delivering a Project Management and Integration (PM&I) budget submittal through the end of the contract, not the end of the fiscal year.

Response 10:

The PM&I budget through the end of the contract is sufficient. However, the work packages and planning packages beyond the end of the contract should be marked up with an overhead rate approximately the same as currently used by TRW.

Question 11:

Please clarify the requirement to consider the end of the contract in defining project milestones delivery dates.

Response 11:

If a deliverable is due to be completed shortly after the transition, every consideration should be made to have it completed before the end of the contract.

Question 12:

The guidance letter references a "base case" for use with each funding profile. This "base case" reference is used only once in the letter. Please clarify what is meant by the "base case" in regards to the three funding profiles.

Response 12:

For planning purposes, the "base case" is the necessary but sufficient work scope to complete the Site Recommendation (SR), Environmental Impact Statement (EIS), and LA. In the three set-aside cases provided, the funding profile beyond FY 2001 is the same. The only difference is the amount assumed for FY 2001. This work scope should not vary due to the amount assumed for FY 2001 and the out-year funding profile. The schedule might be impacted but the SR, EIS, and LA work scope should be the same regardless of the funding level.

If you have any questions, please contact Jane R. Summerson, of my staff, at 794-1493.

J. Russell Dyer
Project Manager

OPC:VWT-1285

Enclosures:
1. Funding set-aside tables for the three funding scenarios
2. Systems Engineering Study
3. Project Summary Schedule Milestones for the Mid-case scenario
4. Yucca Mountain Site Characterization Project WBS Dictionary

cc w/encls:
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cc w/o encl 3 and 4:
R. W. Clark, DOE/OQA, Las Vegas, NV
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PROGRAM PLAN
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
FY 2001 ANNUAL PLAN UPDATE
PROGRAM DIRECTION AND YMP SET-ASIDES ($ Year of Expenditure)

D:\WINNT\Profiles\Administrator\Desktop\Guidance\[FY2001 Planning Set Asides 437 one pd # case.xls]FY00

Contractor	FY 2001	FY 2002	FY 2003	FY 2004
OCRWM Planning Budget	**437,500,000**	**437,500,000**	**871,000,000**	**935,000,000**
YMP Planning Budget (1,2)	**384,685,000**	**377,258,000**	**593,624,000**	**644,024,000**
Program Direction	**29,079,000**	**26,241,000**	**23,409,000**	**23,409,000**
Atomic Energy of Canada Limited	500,000	500,000	500,000	500,000
National Academy of Science	39,000	40,000	40,000	40,000
Bureau Of Reclamation	647,000	647,000	200,000	200,000
Nye County (Drilling Program)	6,400,000	0	0	0
Bechtel	1,937,000	2,044,000	2,156,000	2,274,000
Information Management Direct	500,000	700,000	700,000	700,000
University System	10,000,000	10,000,000	5,400,000	0
UNR (School to Work Program)	100,000	0	0	0
External Oversight	13,171,000	13,061,000	13,618,000	15,331,000
Payment Equal To Taxes	11,341,000	11,341,000	11,341,000	11,341,000
Lease Scoring/Termination Liability	115,000	3,361,000	0	9,019,000
Legal Services	1,250,000	2,000,000	2,000,000	2,000,000
Security Investigations	28,000	32,000	24,000	24,000
M&O Quality Engineering & Field Quality Control (4)	2,801,750	7,350,170	8,463,000	8,463,000
Nevada Rail	0	0	200,000,000	200,000,000
M&O Fee (3)	31,900,000	31,900,000	31,900,000	31,900,000
Contract Transition	12,500,000	0	0	0
YMP Management Reserve	15,000,000	15,000,000	15,000,000	15,000,000
Subtotal YMP Set-Asides	**108,229,750**	**97,976,170**	**291,342,000**	**296,792,000**
Total Set -Asides	**137,308,750**	**124,217,170**	**314,751,000**	**320,201,000**
Total Budget Available for Planning	**247,376,250**	**253,040,830**	**278,873,000**	**323,823,000**

1) For FY 2001 - 2004, Safeguards and Security budget of $6.9M per year has been transferred to the Office of Security and Emergency Operations. See item #4 of general guidance for distribution.
2) FY 2001 YMP Total includes $4,200K for Lease Scoring Return. No SNF budget for any year.
3) There is a potential for a large peak in fee in fiscal 2002. However, this table reflects a level distribution over the four year period of this guidance. The actual distribution will be determined as the Performance Evaluation Management Plan is developed during contract transition.
4) M&O to perform Quality Engineering and Field Quality Control functions after contract transition in February 2001. Work will be budgeted in the 8 leg of the WBS.

MID-CASE FUNDING
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
FY 2001 ANNUAL PLAN UPDATE
PROGRAM DIRECTION AND YMP SET-ASIDES ($ Year of Expenditure)

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Contractor	FY 2001	FY 2002	FY 2003	FY 2004
OCRWM Planning Budget	**395,000,000**	**437,500,000**	**871,000,000**	**935,000,000**
YMP Planning Budget (1,2)	**342,185,000**	**377,258,000**	**593,624,000**	**644,024,000**
Program Direction	**29,079,000**	**26,241,000**	**23,409,000**	**23,409,000**
Atomic Energy of Canada Limited	500,000	500,000	500,000	500,000
National Academy of Sciences	39,000	40,000	40,000	40,000
Bureau Of Reclamation	647,000	647,000	200,000	200,000
Nye County (Drilling Program)	6,400,000	0	0	0
Bechtel	1,937,000	2,044,000	2,156,000	2,274,000
Information Management Direct	500,000	700,000	700,000	700,000
University System	8,500,000	8,500,000	8,400,000	0
UNR (School to Work Program)	100,000	0	0	0
External Oversight	10,535,000	13,061,000	13,618,000	15,331,000
Payment Equal To Taxes	11,341,000	11,341,000	11,341,000	11,341,000
Lease Scoring/Termination Liability	115,000	3,361,000	0	9,019,000
Legal Services	1,250,000	2,000,000	2,000,000	2,000,000
Security Investigations	28,000	32,000	24,000	24,000
M&O Quality Engineering & Field Quality Control (4)	2,801,750	7,350,170	8,463,000	8,463,000
Nevada Rail	0	0	200,000,000	200,000,000
M&O Fee (3)	31,900,000	31,900,000	31,900,000	31,900,000
Contract Transition	12,500,000			
YMP Management Reserve	7,000,000	15,000,000	15,000,000	15,000,000
Subtotal YMP Set-Asides	**96,093,750**	**96,476,170**	**294,342,000**	**296,792,000**
Total Set -Asides	**125,172,750**	**122,717,170**	**317,751,000**	**320,201,000**
Total Budget Available for Planning	**217,012,250**	**254,540,830**	**275,873,000**	**323,823,000**

1) For FY 2001 - 2004, Safeguards and Security budget of $6.9M per year has been transferred to the Office of Security and Emergency Operations. See item #4 of general guidance for distribution.
2) FY 2001 YMP Total includes $4,200K for Lease Scoring Return. No SNF budget for any year.
3) There is a potential for a large peak in fee in fiscal 2002. However, this table reflects a level distribution over the four year period of this guidance. The actual distribution will be determined as the Performance Evaluation Management Plan is developed during contract transition.
4) M&O to perform Quality Engineering and Field Quality Control functions after contract transition in February 2001. Work will be budgeted in the 8 leg of the WBS.

LEVEL FUNDING
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
FY 2001 ANNUAL PLAN UPDATE
PROGRAM DIRECTION AND YMP SET-ASIDES ($ Year of Expenditure)

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Contractor	FY 2001	FY 2002	FY 2003	FY 2004
OCRWM Planning Budget	**350,000,000**	**437,500,000**	**871,000,000**	**935,000,000**
YMP Planning Budget (1,2)	**297,185,000**	**377,258,000**	**593,624,000**	**644,024,000**
Program Direction	**29,079,000**	**26,241,000**	**23,409,000**	**23,409,000**
Atomic Energy of Canada Limited	500,000	500,000	500,000	500,000
National Academy of Sciences	39,000	40,000	40,000	40,000
Bureau Of Reclamation	647,000	647,000	200,000	200,000
Nye County (Drilling Program)	6,400,000	0	0	0
Bechtel	1,937,000	2,044,000	2,156,000	2,274,000
Information Management Direct	500,000	700,000	700,000	700,000
University System	8,500,000	8,500,000	8,400,000	0
UNR (School to Work Program)	100,000	0	0	0
External Oversight	10,196,000	13,061,000	13,618,000	15,331,000
Payment Equal To Taxes	11,341,000	11,341,000	11,341,000	11,341,000
Lease Scoring/Termination Liability	115,000	3,361,000	0	9,019,000
Legal Services	1,250,000	2,000,000	2,000,000	2,000,000
Security Investigations	28,000	32,000	24,000	24,000
M&O Quality Engineering & Field Quality Control (4)	2,801,750	7,350,170	8,463,000	8,463,000
Nevada Rail	0	0	200,000,000	200,000,000
M&O Fee (3)	31,900,000	31,900,000	31,900,000	31,900,000
Contract Transition	12,500,000			
YMP Management Reserve	7,000,000	15,000,000	15,000,000	15,000,000
Subtotal YMP Set-Asides	**95,754,750**	**96,476,170**	**294,342,000**	**296,792,000**
Total Set -Asides	**124,833,750**	**122,717,170**	**317,751,000**	**320,201,000**
Total Budget Available for Planning	**172,351,250**	**254,540,830**	**275,873,000**	**323,823,000**

1) For FY 2001 - 2004, Safeguards and Security budget of $6.9M per year has been transferred to the Office of Security and Emergency Operations. See item #4 of general guidance for distribution.
2) FY 2001 YMP Total includes $4,200K for Lease Scoring Return. No SNF budget for any year.
3) There is a potential for a large peak in fee in fiscal 2002. However, this table reflects a level distribution over the four year period of this guidance. The actual distribution will be determined as the Performance Evaluation Management Plan is developed during contract transition.
4) M&O to perform Quality Engineering and functions and Field Quality Control after contract transition in February 2001. Work will be budgeted in the 8 leg of the WBS.

ENCLOSURE 2

System Engineering Study

The systems engineering group is to lead this effort and is to coordinate/integrate with the performance assessment, scientific, and engineering/design organizations.

SCOPE of WORK:

A system study will be implemented that should lead to recommendations of approaches that may be taken to reduce the calculated potential peak dose rate, up to 1 million years postclosure, for a representative individual at 20 km. A systems engineering approach will take three simultaneous actions, in cooperation with the performance assessment, engineering/design, and science functions: (1) investigate options for adjustments in the modeling approach taken for engineered barrier system components, including radionuclide solubilities in the waste package, based on defensible data and experimental observations, (2) targeting studies of natural system and biosphere processes that may bring more realism into the modeling of natural system performance, especially radionuclide transport and biosphere transfer of radionuclides to humans, and (3) investigate the potential for lowering peak dose through engineering and design adjustments.

The systems engineering group will lead this effort and will coordinate/integrate with the performance assessment, scientific, and engineering/design organizations.

DELIVERABLE:

Six months from the time work starts, deliver a Letter Report to the DOE that makes recommendations in the three areas outlined in the Scope of Work, above.

ACCEPTANCE CRITERIA:

Letter Report must have the following minimum content:

Recommendation of specific tasks, their potential effectiveness in reducing peak dose, their time requirements, and costs. These are to be quantitative estimates to the extent practicable, otherwise qualitative. The requirement is to provide well-supported estimates, whether calculations or statements of informal expert judgment, on which decisions can be based with some degree of confidence.

Documentation must include synopses of key meetings on supporting topics that show the effort was well integrated, involved the Project's experts in each area, and was sufficiently comprehensive to have addressed the Scope of Work.

DISCUSSION ON QUALITY ASSURANCE (QA):

The Civilian Radioactive Waste Management System Management and Operating Contractor, through implementation of approved procedures, should determine QA applicability. Nevertheless, the calculations used to assess peak dose are required to be technically defensible, traceable, and will include an appropriate level of uncertainty-evaluation. These are non-trivial requirements, and should be factored into estimates of cost and time requirements for recommended actions in the Letter Report.

It is anticipated that all data, process level modeling, and abstracted models developed to assess repository performance over a 1 million year period will be documented in the analysis and model reports and process model reports that support the final site recommendation and the license application. Separate reports on peak dose calculations are not planned. Compliance evaluations will, however, only address the 10,000 year regulatory period and the requirements that apply to that period. Publicly available publication of peak dose calculation results will occur in other documents, perhaps to become available at the same time as the compliance documents, but not accompanying those documents as part of the formal compliance case.

ENCLOSURE 3

FY01 Planning

Milestone

Description

Sheets

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M1RH
PSS Title: OCRWM Submits Preliminary Final Environmental Impact Statement for DOE Concurrence
(OCRWM Submits PFEIS for Final DOE Concurrence)

WBS Number: 1.2.20.1.2 **DECISION DOCUMENTATION REQUIRED - YES___NO_X__**
Product: Environmental Impact Statement
Subproduct: Final Environmental Impact Statement
Scheduled Date: 04/27/01
Milestone Level: M2

Milestone Description:

Preparation of a package consisting of the camera-ready copy of the Final EIS for delivery for DOE Concurrence.

The YMSCO, DOE Headquarters, DOE Sites, DOE Programs, and institutional reviews of the FEIS (which includes resolution of internal DOE and contractor comments) shall be completed. The FEIS shall reflect comments and direction provided through the review process by senior Headquarters management as directed by AMLRC.

Acceptance Method:

This milestone will be considered accepted by DOE upon receipt of the letter by the YMSCO EIS Project Manager to the Assistant Manager for the Office of Licensing and Regulatory Compliance documenting the completion of this activity in accordance with applicable requirements of the deliverable description and AP-7.5Q and the camera-ready copy of the FEIS is delivered for DOE concurrence. The FEIS shall incorporate agreed to resolution of YMSCO, DOE Headquarters, DOE Sites, DOE Programs, and institutional comments.

Key Predecessor Milestones:

M2CW YMSCO Submits Proposed FEIS to Management Council and Executive Committee for Review

Key Successor Milestones:

None

Supporting Level 3 Milestones:

SSJ102M3 Deliver PFEIS with YMSCO/EIS Manager Comments Incorporated

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Change Request Date:
Change Request Number:

Functional Manager:_____ **Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2CW
PSS Title: YMSCO Submits Preliminary FEIS to Management Council and Executive Committee for Review
(YMSCO Submits Proposed FEIS to MC&EC for Rev)

WBS Number: 1.2.20.1.2 **DECISION DOCUMENTATION REQUIRED - YES___NO_X__**
Product: Environmental Impact Statement
Subproduct: Final Environmental Impact Statement
Scheduled Date: 03/01/01
Milestone Level: M2

Milestone Description:

The EIS Project Manager shall prepare a letter to the Assistant Manager for the Office of Licensing and Regulatory Compliance in accordance with applicable requirements of the deliverable description and AP-7.5Q. The letter shall document: (1) completion of the preliminary (or draft) FEIS and that it is ready for review by the Management Council and Executive Committee, (2) completion of the YMSCO, DOE Headquarters, DOE Sites, DOE Programs, and Institutional reviews of the PFEIS (which includes resolution of comments), (3) incorporation of the comment resolution directives, if any, into the PFEIS, and (4) completion of concurrence/approval by OCRWM Headquarters (e.g., RW-52) and senior OCRWM Headquarters management (e.g., RW-1). The PFEIS shall reflect and implement comments and direction provided through the review process by OCRWM management.

Expectations/Acceptance Criteria:

(1) Completion of the preliminary (or draft) FEIS and that it is ready for review by the Management Council and the Executive Committee,
(2) Completion of the YMSCO, DOE Headquarters, DOE Sites, DOE Programs, and Institutional reviews of the PFEIS (which includes resolution of comments),
(3) Incorporation of the comment resolution directives, if any, into the PFEIS,
(4) Completion of concurrence/approval by OCRWM Headquarters (e.g., RW-52) and senior OCRWM Headquarters management (e.g., RW-1).

Acceptance Method:

A copy of the Final EIS and the YMSCO, DOE Headquarters, DOE Sites, DOE Programs, and Institutional comment resolution documents shall be delivered to AM-OLARC in accordance with applicable requirements of the deliverable description and AP-7.5Q. The DEIS shall incorporate agreed upon resolution of YMSCO, DOE Headquarters, DOE Sites, DOE Programs, and Institutional comments. This milestone will be considered accepted by DOE upon receipt of the letter by the YMSCO EIS Project Manager to the Assistant Manager for the Office of Licensing and Regulatory Compliance documenting the completion of this activity in accordance with applicable requirements of the deliverable description and AP-7.5Q.

Key Predecessor Milestones:

M2RK	Deliver Draft CRD for RW/ Management Council Review
SSJ102M3	Deliver PFEIS with YMSCO/EIS Manager Comments Incorporated

Key Successor Milestones:

M1RH OCRWM Submits Preliminary Final EIS for DOE Concurrence

Supporting Level 3 Milestones:

SSJ102M3 Deliver PFEIS with YMSCO/EIS Manager Comments Incorporated

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Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2RH
PSS Title: Final Environmental Impact Statement Hold Point
(Final EIS Hold Point)
****Review TSPA-SR Revision 1 (Verified) to Determine What Differences Exist Between TSPA-SR Revision 1 (Unverified) and TSPA-SR Revision 1 (Verified); if Significant Unanalyzed Differences Exist, the Final EIS Issuance Date May Not Be Met**

WBS Number: 1.2.20.1.2 **DECISION DOCUMENTATION REQUIRED - YES___NO_X__**
Product: Environmental Impact Statement
Subproduct: Final Environmental Impact Statement
Scheduled Date: 03/10/01
Milestone Level: M2

Milestone Description:

The EIS Project Manager shall have a review performed of the TSPA-SR Revision 1 document that is due for DOE acceptance review on March 1, 2001. The purpose of the review will be to determine what differences exist between the results of the TSPA-SR Revision 1 (unverified) provided to the EIS organization on January 10, 2001 and TSPA-SR Revision 1 (verified) that is scheduled for completion on March 1, 2001.

Expectations/Acceptance Criteria:

If significant unanalyzed differences exist, or if the TSPA-SR Revision 1 (verified) analysis projects environmental effects that significantly different than those projected in the TSPA-SR Revision 1 (unverified) provided to the EIS organization on January 10, 2001, the FEIS issuance date may not be met. The letter shall indicate whether or not the differences identified are significant, the effects of the differences on the FEIS and proposed resolutions.

Acceptance Method:

This milestone will be considered accepted by DOE upon receipt of the letter by the YMSCO EIS Project Manager to the Assistant Manager for the Office of Licensing and Regulatory Compliance documenting the completion of this activity in accordance with applicable requirements of the deliverable description and AP-7.5Q.

Key Predecessor Milestones:

SL984M3 TSPA-SR CP AP3.10Q

Key Successor Milestones:

M1RH OCRWM Submits Preliminary FEIS for DOE Concurrence

Supporting Level 3 Milestones:

SL984M3 TSPA-SR CP AP3.10Q

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M0AC
PSS Title: DOE Publishes Federal Register Notice of Site Recommendation Consideration Hearings and Requests Comments from States (DOE Pub.FR Not. Of SR Consid.Hear.& Req.Com.States)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED YES_X__NO___**
Product: Site Recommendation
Subproduct: N/A
Scheduled Date: 11/13/00
Milestone Level: M0

Milestone Description:

This Level 0 milestone will be complete when the DOE publishes in the Federal Register the Notice of Consideration for site recommendation and request for public and state comments. This decision will be supported by DOE concurrence on the SR Consideration Report and by a recommendation that the DOE publish the notice of consideration.

Acceptance Method:

Federal Register publication of Notice of Consideration

Key Predecessor Milestones:

M1NX – OCRWM Completes DOE Review & Concurrence of Site Recommendation Consideration Report

Key Successor Milestones:

M1GV – OCRWM Requests NRC Sufficiency Comments
M1BB – OCRWM Releases Site Recommendation Consideration Report for Public Review
M1BD – Complete SR Consideration Hearings
M1BE – Close Public and State Comment Period on SR Consideration

Supporting Level 3 Milestones: N/A

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M0AG
PSS Title: DOE Notifies State of Site Recommendation Decision
(DOE Notifies State of SR Decision)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED - YES__X_NO___**
Product: Site Recommendation
Subproduct: Basis for Recommendation
Scheduled Date: 06/27/01
Milestone Level: M0

Milestone Description:

This Level 0 will be complete when, as required by the NWPA, the Secretary formally notifies the State of Nevada of the decision to recommend the site prior to submittal of a site recommendation to the President.

Acceptance Method:

This milestone is complete when the Secretary notifies the State as required by the NWPA.

Key Predecessor Milestones:

M0PP – Secretarial Decision on Site Recommendation

Key Successor Milestones:

M0AJ – Secretary Submits SR to President

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M0AJ
PSS Title: DOE Issues Site Recommendation to President
(DOE Issues SR to President)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED - YES___NO__X_**
Product: Site Recommendation
Subproduct: N/A
Scheduled Date: 07/27/01
Milestone Level: M0

Milestone Description:

For planning purposes, the submittal will consist of four SR volumes, together with the final Environmental Impact Statement, and will address the following requirements of NWPA 114(a)(1): A) a description of the proposed repository, including preliminary engineering specifications for the facility, B) a description of the waste form or packaging material proposed for use at the repository, and an explanation of the relationship between the waste form or packaging and the geologic medium of the site, C) a discussion of the data obtained in site characterization activities relating to the safety of the site, D) a final Environmental Impact Statement, E) preliminary comments of the Nuclear Regulatory Commission concerning the extent to which the at-depth site characterization analysis and the waste form proposal for the site seem to be sufficient for inclusion in any application to be submitted for licensing, F) the views and comments of the Governor and legislature of any State, or the governing body of any designated affected Indian tribe, with the Secretary's response to these views and comments, G) any impact report submitted by the State of Nevada and designated affected Indian tribe, and H) any other information the Secretary considers appropriate.

Acceptance Method:

This milestone is complete when the Secretary of Energy submits the Site Recommendation and supporting bases to the President as required by the NWPA.

Key Predecessor Milestones:

M0AJ – DOE Submits SR Report to President
M1BH – OCRWM Completes DOE Review and Concurrence of SR
M0AA – Publish Notice of Availability for the FEIS
M0PP – Secretarial Decision on Site Recommendation

Key Successor Milestones:

M2JX – Complete Administrative Record for SR

Supporting Level 3 Milestones: N/A

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M0PP
PSS Title: Secretarial Decision on Site Recommendation

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: Site Recommendation
Subproduct: Basis for Recommendation
Scheduled Date: 06/26/01
Milestone Level: M0

Milestone Description:

Upon completion of site recommendation consideration hearings and completion of site characterization activities, the Secretary may decide to recommend approval of the Yucca Mountain site to the President [NWPA 114(a)(1)]. This decision is based on information including a positive site suitability finding, a Final Environmental Impact Statement, and views and comments of the Nuclear Regulatory Commission, the States and affected tribes, and the residents in the area of the site, along with any other information the Secretary considers appropriate. This decision means that the Secretary will submit the recommendation to the President without further comment or review, although the State of Nevada will be notified of the decision no sooner than 30 days before the submittal to the President.

Acceptance Method:

This milestone is accepted by notifying the State of Nevada in accordance with the requirements of NWPA Section 114(a)(1).

Key Predecessor Milestones:

M1BH – SR Documents Submitted to Secretary

Key Successor Milestones:

M0AG – DOE Notifies State of SR Decision
M0AJ – DOE Submits SR Report to President

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1BB
PSS Title: OCRWM Releases Site Recommendation Consideration Report for Public Review
(OCRWM Releases SR Consid Rpt for Public Rev)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED –YES___NO_x__**
Product: Site Recommendation
Subproduct: N/A
Scheduled Date: 11/13/00
Milestone Level: M1

Milestone Description:

Upon publication in the Federal Register of the Secretary's notice of consideration hearings, the DOE approved Site Recommendation Consideration Report will be made available to the public, to the Governors of the States, and placed on the Internet for public access. The Site Recommendation Consideration Report provides the basis for the consideration hearings held in the vicinity of the site as required by NWPA 114(a)(1). It also provides the basis for the solicitation of the views and comments of the Governors and Legislatures of the States on the possible recommendation as required by the NWPA 114(a)(1)(F). Documentation supporting the Site Recommendation Consideration Report will be available on request and will be made available in public reading rooms and libraries in selected locations.

Acceptance Method:

This milestone is complete when the Site Recommendation Consideration Report is provided to members of the public and appropriate public interest organizations, and to the Governors of the States, and is placed on the Internet for public access.

Key Predecessor Milestones:

MOAC – DOE Publishes Federal Register Notice of SR Consideration Hearings and Requests for Comments from States

Key Successor Milestones:

M1BD – Complete SR Consideration Hearings
M1BE – Close Public & State Comment Period/SR Consideration

Supporting Level 3 Milestones: N/A

Change Request Date:
Change Request Number:

Functional Manager:_____ **Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M1BD
PSS Title: Complete Site Recommendation Consideration Hearings (Complete SR Consideration Hearings)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED – YES__NO_x__**
Product: Site Recommendation
Subproduct: Summary of Views and NRC Sufficiency Comments
Scheduled Date: 01/12/01
Milestone Level: M1

Milestone Description:

This milestone is complete when the consideration hearings specified in the DOE's notice of consideration have been held in the vicinity of the site to inform the residents of the possible recommendation and to receive their comments, as required by the Nuclear Waste Policy Act, Section 114(a)(1).

Acceptance Method:

This milestone will be complete at the close of the public hearings.

Key Predecessor Milestones:

M0AC – DOE Publishes Federal Register Notice of SR Consideration Hearings & Request Comments from States

Key Successor Milestones:

M1BE – Close Public and State Comment Period on SR Consideration
M2NG – YMSCO Submits Complete SR Report for DOE Review

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M1BE
PSS Title: Close Public and State Comment Period on Site Recommendation Consideration (Close Public and State Comment Period on SR Consideration)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED – YES__NO_x__**
Product: Site Recommendation
Subproduct: Summary of Views and NRC Sufficiency Comments
Scheduled Date: 02/12/01
Milestone Level: M1

Milestone Description:

This milestone is complete at the end of the comment period specified in the DOE's notice of consideration for receipt of written comments from the residents of Nevada (NWPA 114(a)(1)) and from the Governors and Legislatures of the States (NWPA 114(a)(1)(F)) on the DOE's possible consideration of site recommendation. The comments received from the States and the DOE's response to these comments will be included in Vol. 3 of the SR.

Acceptance Method:

This milestone is complete on the date set in the notice of consideration for the close of the public and State comment period, unless the comment period is extended.

Key Predecessor Milestones:

M1BB – OCRWM Releases Site Recommendation Consideration Report for Public Review
M1BD – Complete SR Consideration Hearings

Key Successor Milestones:

M2NG – YMSCO Submits Complete SR Report for DOE Review
M2MK – Complete OCRWM Project & Office Manager Concurrence of License Application

Supporting Level 3 Milestones: N/A

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M1BH
PSS Title: OCRWM Submits Site Recommendation to Secretary
(OCRWM Submits SR to Secretary)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED – YES__x_NO___**
Product: Site Recommendation
Subproduct: Basis for Recommendation, YM Site Char. & Repository Design, Suitability Criteria Compliance Evaluation, and Summary of Views and NRC Sufficiency Comments
Scheduled Date: 06/13/01
Milestone Level: M1

Milestone Description:

There will be a single, formal, DOE-wide review of the SR product. The review and concurrence process will depend on the identification of points of contact (POCs) for each DOE office that will concur on the SR product. The POCs will represent their respective offices and will have the responsibility to reflect the views of that office and to facilitate the concurrence by that office.

This milestone is complete upon completion of the DOE review of the SR (in particular, Vols. 3-4, which contain new information), resolution of comments received from concurring offices, and concurrence of these offices on the SR (Vols. 1-4) for transmittal to the Secretary. The SR will be consistent with the Annotated Outline for the SR and any modifications agreed to by DOE. The SR will meet the content requirements in NWPA 114(a)(1)(A)-(H).

Acceptance Method:

This milestone is complete following completion of a DOE review, resolution of comments received, concurrence by the appropriate reviewing offices within DOE, and submittal to the Secretary of SR Vols. 1-4, together with the FEIS and a Secretarial action memorandum concerning the site recommendation.

Key Predecessor Milestones:

M2NG – YMSCO Submits Complete SR for DOE Review

Key Successor Milestones:

M2JX – YMSCO Completes Administrative Record for SR
M0PP – Secretarial Decision on Site Recommendation

Supporting Level 3 Milestones: N/A

Change Request Date:
Change Request Number:

Functional Manager:_____ **Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1GV
PSS Title: DOE Requests Nuclear Regulatory Commission Sufficiency Comments (DOE Requests NRC Sufficiency Comments)

WBS Number: 1.2.21.4 **DECISION DOCUMENTATION REQUIRED – YES___NO__x_**
Product: Site Recommendation
Subproduct: Summary of Views and Nuclear Regulatory Commission Sufficiency Comments
Scheduled Date: 11/13/00
Milestone Level: M1

Milestone Description:

This milestone is a formal DOE request (correspondence) to the NRC for their preliminary comments concerning the extent to which DOE's site characterization analysis and waste form proposal seem to be sufficient for inclusion in a license application, as required by the Nuclear Waste Policy Act (NWPA), Section 114(a)(1)(E). The request will ask for NRC's comments to be complete by 5/25/01. The documentary information provided to the NRC staff prior to this request will be supplemented by various information exchanges with the NRC staff and transmittal of relevant documents produced following the request for comments. Subsequent review sources will be provided to the NRC staff either when applicable updated information becomes available or when requested by the NRC as necessary to their review.

Acceptance Method:

This milestone will be complete when a request for comments is sent to NRC by DOE.

Key Predecessor Milestones:

M2JG – TSPA-SR Rev. 0

Key Successor Milestones:

MXJA – DOE Receives NRC Sufficiency Comments

Supporting Level 3 Milestones: N/A

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M1NX
PSS Title: OCRWM Completes DOE Review and Concurrence of Site Recommendation Consideration Report
(OCRWM Cmpl. DOE Rev. & Concur. SR Consid. Rpt)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED – YES_x_NO___**
Product: Site Recommendation
Subproduct: YM Site Characterization & Repository Design, Suitability Criteria Compliance Evaluation
Scheduled Date: 10/06/00
Milestone Level: M1

Milestone Description:

This milestone is complete upon completion of the DOE review of the Site Recommendation Consideration Report, resolution of comments received from concurring offices, and concurrence by these offices on the product for transmittal to the Secretary as a basis for a recommendation to issue the FR Notice of Consideration Hearings that are required by NWPA 114(a)(1).

There will be a single, formal, DOE-wide review of the SR product at each step. The review and concurrence process will depend on the identification of points of contact (POCs) for each DOE office that will concur on the SR product. The POCs will represent their respective offices and will have the responsibility to reflect the views of that office and to facilitate the concurrence by that office.

The Site Recommendation Consideration Report will be consistent with the annotated outline for SR content, or modifications agreed to by DOE, at this stage of SR development. The SR will comprise of 2 volumes. Vol. 1 will contain, at an appropriate level of detail, the essential information from the current version of the site description, repository and waste package design description, and the total system performance assessment and the preliminary preclosure safety evaluation documents. Vol. 2 will contain the preliminary evaluation of compliance with 10 CFR 963.

Acceptance Method:

This milestone is complete following completion of a DOE review, resolution of comments received, concurrence by the appropriate reviewing offices within DOE, and submittal to the Secretary of a recommendation to publish the notice of consideration.

Key Predecessor Milestones:

M2NL – YMSCO Submits SR Consideration Report for DOE Review
M2NU – YMSCO Accepts Yucca Mountain Site Description
M2JG – TSPA-SR Rev.00

Key Successor Milestones:

M0AC – DOE Publishes Federal Register Notice of SR Consideration Hearings and Request Comments From States

Supporting Level 3 Milestones:

SL921M3 – TSPA-SR Rev. 0
SLSR7EM3 – Submit Hearings Draft SR Volumes 1 & 2 for DOE Review

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Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1YQ
PSS Title: OCRWM Accepts Progress Report 22
(OCRWM Accepts PR22)

WBS Number: 1.2.22.1.3 **DECISION DOCUMENTATION REQUIRED – YES___NO__X_**
Product: License Application
Subproduct: Technical Support for License Application
Scheduled Date: 10/04/00
Milestone Level: M1

Milestone Description:

Following the M&O and USGS management and AM concurrence reviews, YMSCO delivers the Progress Report to DOE-HQ. All sections of the Progress Report are complete. Two copies of resolved comment sheets from the AM concurrence review will accompany the HQ concurrence copy. All comments received informally from HQ during YMSCO review are resolved to the satisfaction of the HQ reviewer. Any addition comments received from the HQ concurrence process have been resolved and incorporated. The level 1 deliverable is followed by M&O/YMSCO support to provide a camera-ready copy following HQ concurrence.

Acceptance Method:

Acceptance is by DOE HQ (OCRWM HQ, Congressional Programs (CP), General Counsel (GC), Executive Secretariat, the Secretary, and DOE Order 1340 review for publication) approval of the Progress Report. The Level 1 milestone is followed by issuance of the Progress Report per NWPA requirements within thirty (30) days of DOE HQ approval. When concurrence is obtained from OCRWM HQ, CP and GC reviews and the DOE Order 1340 review is complete, the Progress Report is forwarded to the Executive Secretariat and the Secretary for a one-week courtesy review. After the one-week courtesy review period, particularly if issuance has been severely delayed, YMSCO, with OCRWM approval, may exercise the option of issuing the Progress Report without written Executive Secretariat and Secretary approval.

Key Predecessor Milestones:

M2KA – YMSCO Delivers PR22 to DOE Headquarters

Key Successor Milestones:

M2KE – YMSCO Delivers PR23 to DOE Headquarters

Supporting Level 3 Milestones:

SLPR22M3 – PR22 AM Concurrence Review
SLPRFMM3- PR22 HQ Concurrence Draft

Change Request Date:
Change Request Number:

Functional Manager: _____Date: _____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1YR
PSS Title: OCRWM Accepts Progress Report 23
(OCRWM Accepts Progress Report 23)

WBS Number: 1.2.22.1.3 **DECISION DOCUMENTATION REQUIRED – YES___NO__X_**
Product: License Application
Subproduct: Technical Support for License Application
Scheduled Date: 02/01/01
Milestone Level: M1

Milestone Description:

Following the M&O and USGS management and AM concurrence reviews, YMSCO delivers the Progress Report to DOE-HQ. All sections of the Progress Report are complete. Two copies of resolved comment sheets from the AM concurrence review will accompany the HQ concurrence copy. All comments received informally from HQ during YMSCO review are resolved to the satisfaction of the HQ reviewer. Any addition comments received from the HQ concurrence process have been resolved and incorporated. The level 1 deliverable is followed by M&O/YMSCO support to provide a camera-ready copy following HQ concurrence.

Acceptance Method:

Acceptance is by DOE HQ (OCRWM HQ, Congressional Programs (CP), General Counsel (GC), Executive Secretariat, the Secretary, and DOE Order 1340 review for publication) approval of the Progress Report. The Level 1 milestone is followed by issuance of the Progress Report per NWPA requirements within thirty (30) days of DOE HQ approval. When concurrence is obtained from OCRWM HQ, CP and GC reviews and the DOE Order 1340 review is complete, the Progress Report is forwarded to the Executive Secretariat and the Secretary for a one-week courtesy review. After the one-week courtesy review period, particularly if issuance has been severely delayed, YMSCO, with OCRWM approval, may exercise the option of issuing the Progress Report without written Executive Secretariat and Secretary approval.

Key Predecessor Milestones:

M2KE – YMSCO Delivers PR23 to DOE Headquarters

Key Successor Milestones:

M2MA – YMSCO Delivers PR24 to DOE Headquarters

Supporting Level 3 Milestones:

SLPR23M3 – PR23 AM Concurrence Review
SLPRGMM3 – PR23 HQ Concurrence Draft

Change Request Date:
Change Request Number:

Functional Manager: _____Date: _____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1YT
PSS Title: OCRWM Accepts Progress Report 24
(OCRWM Accepts PR 24)

WBS Number: 1.2.22.1.3 **DECISION DOCUMENTATION REQUIRED – YES___NO__X_**
Product: License Application
Subproduct: Technical Support for License Application
Scheduled Date: 09**/**26/01
Milestone Level: M1

Milestone Description:

Following the M&O and USGS management and AM concurrence reviews, YMSCO delivers the Progress Report to DOE-HQ. All sections of the Progress Report are complete. Two copies of resolved comment sheets from the AM concurrence review will accompany the HQ concurrence copy. All comments received informally from HQ during YMSCO review are resolved to the satisfaction of the HQ reviewer. Any addition comments received from the HQ concurrence process have been resolved and incorporated. The level 1 deliverable is followed by M&O/YMSCO support to provide a camera-ready copy following HQ concurrence.

Acceptance Method:

Acceptance is by DOE HQ (OCRWM HQ, Congressional Programs (CP), General Counsel (GC), Executive Secretariat, the Secretary, and DOE Order 1340 review for publication) approval of the Progress Report. The Level 1 milestone is followed by issuance of the Progress Report per NWPA requirements within thirty (30) days of DOE HQ approval. When concurrence is obtained from OCRWM HQ, CP and GC reviews and the DOE Order 1340 review is complete, the Progress Report is forwarded to the Executive Secretariat and the Secretary for a one-week courtesy review. After the one-week courtesy review period, particularly if issuance has been severely delayed, YMSCO, with OCRWM approval, may exercise the option of issuing the Progress Report without written Executive Secretariat and Secretary approval.

Key Predecessor Milestones:

M2MA – YMSCO Delivers PR24 to DOE Headquarters

Key Successor Milestones:

Supporting Level 3 Milestones:

SLPR24M3 – PR24 AM Concurrence Review
SLPRJMM3 – PR24 HQ Concurrence Draft

Change Request Date:
Change Request Number:

Functional Manager: _____ **Date:** _____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2AZ
PSS Title: Complete Excavation of Cross Drift Alcoves and Niches
(Complete Excavation of Cross Drift Alcoves & Niches)

WBS Number: 1.2.22.6.C **DECISION DOCUMENTATION REQUIRED – YES___NO *X***
Product: License Application
Subproduct: Test Support and Construction Services
Scheduled Date: 08/15/01
Milestone Level: M2

Milestone Description:

Complete excavation of alcoves and niches in the ECRB Cross Drift. This milestone includes construction of the Cross-Over Alcove, Crest Alcove, cross drift thermal test alcove; and construction of two hydraulic analysis niches, as identified in the MYP and applicable Change Requests.

Acceptance Method:

Completion of this deliverable will be documented by a letter from DOE to the DOE Project Manager indicating that construction of the alcoves and niches are completed in accordance with approved drawings and specifications.

Key Predecessor Milestones:

M2GT – Complete Cross Drift Excavation to Station 28+23
SC811M3 – Complete ECRB Niche 1 and 2 Design

Key Successor Milestones:

None

Supporting Level 3 Milestones:

SC809M3 – Complete Excavation of ECRB Niche 1 and 2
SCM070M3 – Complete ECRB Construction

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2JG
PSS Title: Total System Performance Assessment - Site Recommendation - Revision 00 (TSPA-SR Rev. 00)

WBS Number: 1.2.21.3.2 **DECISION DOCUMENTATION REQUIRED - YES__X_NO___**
Product: Site Recommendation
Subproduct: Suitability Criteria Compliance Evaluation
Scheduled Date: 10/16/00
Milestone Level: M2

Milestone Description:

TSPA-SR Rev. 00 will be used to support the Site Recommendation process and the preliminary suitability evaluation. TSPA-SR Rev. 00 will provide a reasonable estimate of the long-term behavior of the total repository system. TSPA-SR Rev. 00 will include models for all potentially significant features, events, and processes that may affect the ability of the site and EBS to contain/isolate radioactive waste. These models will represent the understanding of these features, events and processes and will explicitly address the level of uncertainty in this understanding as of November, 1999. Where appropriate and warranted, these models will be conservative. The total repository system that will be analyzed includes all aspects of the design as of May, 1999 (waste package, engineered barrier segment and repository), the site conditions that potentially impact the containment and isolation of radionuclides from the biosphere, and the biosphere itself.

TSPA-SR Rev. 00 will use updates of the total system models from TSPA-VA drawn from process-level models (developed in the site-characterization, environmental and design programs), from subsystem models developed in other PA activities, and from models developed from other data sources where required to adequately represent the total system. The conceptual SR repository design and revision 0 of the Process Models Reports (PMRs) will provide the basis for updating the abstracted total system models.

TSPA modules which may be updated include those for: UZ and SZ flow and transport, integrated near-field environment and source term (including waste package degradation, cladding degradation, waste form dissolution, radionuclide mobilization, engineered barrier transport), waste package, engineered barrier segment and repository design, abstracted representations of volcanism, seismic activity, human intrusion, and criticality conditions. Abstracted models will be updated through November 1999. Where necessary, the abstracted models will be conservative. These modules will then be incorporated into a total-system representation.

The total system model will be used to perform analyses of radionuclide release and ultimately the peak concentration, dose or risk associated with these releases to the biosphere. Analyses will be performed to support the the preliminary suitability evaluation. Sensitivity analyses will be conducted, as warranted to support the preliminary suitability evaluation.

The analyses and documentation of TSPA-SR Rev. 00 will be based on the approach defined in the TSPA-SR Methods and Assumptions (M&A) document. Analyses and models documented in the Analysis and Model Reports (AMRs) and revision 0 of the PMRs will be utilized as necessary in the TSPA analyses and documentation. Documentation of the abstractions from the process models will be included in the PMRs. A stand-alone document will be produced. It will include all documentation needed to support the preliminary suitability evaluation. The document will be reviewed by all affected M&O organizations prior to completion of the Milestone.

Briefings addressing the progress/status of activities leading to the successful, on-time completion of this milestone will be conducted. Briefings will be to applicable YMSCO personnel by key M&O Performance Assessment managers, and will be supported with material suitable for YMSCO videoconference interactions with OCRWM semi-annual briefings addressing the progress/status of activities leading to the successful, on-time completion of the milestone will be conducted.

Acceptance Method:

This milestone will be completed following the AP-7.5Q review of the supporting Level 3 Milestone and resolution of all comments. The Product Manager will notify the Project Manager by letter verifying requirements have been met.

Key Predecessor Milestones:

M2MQ - SR Design and Options Selection
M2JH - TSPA-SR Methodology & Assumptions Document
M2JA – Complete Information Feeds from Science & Design to TSPA
M2JB – Repository Design Feed to Performance Assessment
M2HK – Integrated Site Model Process Model Report for SR
M2HU – Biosphere Process Model Report
M2HN – Engineered Barrier System Degradation Process Model Report
M2GY – Waste Package Degradation Process Model Report
M2GH – Waste Form Degradation Process Model Report
M2JC – Near Field Process Model Report for SR
M2HC – Unsaturated Zone Process Model Report for SR
M2HD – Saturated Zone Process Model Report for SR
M2HJ – Tectonics Process Model Report

Key Successor Milestones:

M2NW – TSPA-SR Rev. 01
M1NX – OCRWM Completes DOE Review & Concurrence of Consideration Hearings Draft SR

Supporting Level 3 Milestones:

SL921M3 - TSPA-SR Rev. 00

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2JV
PSS Title: DOE Certificate of Compliance with 10CFR Part 2, Subpart J

WBS Number: 1.2.22.6.3 **DECISION DOCUMENTATION REQUIRED – YES__X_NO___**
Product: License Application
Subproduct: Technical and Regulatory Implementation
Scheduled Date: 08/27/01
Milestone Level: M2

Milestone Description:

The DOE will complete development and make available to the NRC and other potential parties to licensing an electronic information system consistent with the requirements of 10 CFR Part 2, Subpart J. This system will provide electronic access to the DOE's documentary material as defined in Subpart J. Access to this material must be available within 30 days from the time the Department of Energy recommends the site to the President. The DOE must certify to the NRC that the requirements of Subpart J have been met.

This milestone will be completed when DOE certifies that the DOE has complied with the requirements of 10CFR Part 2, Subpart J, to provide electronic access to its documentary record, as defined in Subpart J.

Acceptance Method:

The Product Manager will notify the Project Manager by letter verifying requirements have been met.

Key Predecessor Milestones:

M2KV – YMSCO Accepts Electronic Information System
M0AJ – DOE Issues SR to President

Key Successor Milestones:

M0AM – DOE Submits License Application to NRC

Supporting Level 3 Milestones:
Need to add a Level 3 milestone to certify to DOE that an electronic information system is available and consistent with the requirements of 10CFR Part 2, Subpart J.

Change Request Date:
Change Request Number:

Functional Manager:_____**Date**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2JX
PSS Title: YMSCO Completes Administrative Records for Site Recommendation (YMSCO Completes Administrative Records for SR)

WBS Number: 1.2.21.5.3 **DECISION DOCUMENTATION REQUIRED - YES___NO X__**
Product: Site Recommendation
Subproduct: Technical and Regulatory Implementation
Scheduled Date: 08/27/01
Milestone Level: M2

Milestone Description:

This milestone will be met when the Administrative Record supporting the Site Recommendation is completed and accepted by YMSCO. The record for this activity will be completed through the compilation of a complete list of all information that was directly considered in the development of the SR. It will constitute "the record of information" that meets the requirements and description for the Statement in NWPA Section 114(a)(1). Traceability to the repository for all supporting information (e.g. records systems or technical data management system) will be maintained by referencing the appropriate product or accession number. In order to comply with the requirement to "make available to the public" the basis for the SR, this milestone will include the development of an electronic version of the list of information, suitable for release to the internet. It will include linkages to the record copies of cited documents that are not protected by copyright and, where appropriate, to data contained in the technical data management system.

Acceptance Method:

This milestone will be complete when the record is ready for release to the internet. This milestone follows completion of the DOE-wide review and concurrence of the SR, and submittal of the SR to the Secretary, so that the record will be complete. The record will be made available to the public upon the Secretary's recommendation of the site to the President. The Product Manager will notify the Project Manager by letter verifying requirements have been met.

Key Predecessor Milestones:

M1BH – OCRWM Completes DOE Review and Concurrence of SR
M0PP – Secretarial Decision on Site Recommendation

Key Successor Milestones:

Supporting Level 3 Milestones:

TBDM3 – SR Administrative Record Submitted to YMSCO for Acceptance, 7/11/01

Change Request Date:
Change Request Number:

Functional Manager:_____ **Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2KE
PSS Title: YMSCO Delivers Progress Report 23 to DOE Headquarters
(YMSCO Delivers PR23 to DOE Headquarters)

WBS Number: 1.2.22.1.3 **DECISION DOCUMENTATION REQUIRED- YES__NO__X_**
Product: License Application
Subproduct: General Information
Scheduled Date: 12/18/00
Milestone Level: M2

Milestone Description:

The Progress Report is issued every six months as required by the Nuclear Waste Policy Act and it will describe the nature and extent of site characterization activities and shall contain the information required by 10 CFR 60.18(g) or the final 10 CFR 63. The document has been reviewed by M&O and USGS management for completeness, accuracy, and agreement with current DOE policy and all comments resolved. All comments received informally from HQ during the AM review period are resolved to the satisfaction of the HQ reviewer. All sections are complete, including the list of references. One copy of resolved comment sheets from the AM concurrence review will accompany the HQ concurrence copy.

Acceptance Method:

Receipt of PR 23 at DOE Headquarters.

Key Predecessor Milestones:

M2KA – YMSCO Delivers PR22 to DOE Headquarters

Key Successor Milestones:

M1YR – OCRWM Accepts Progress Report 23

Supporting Level 3 Milestones:

SLPR23M3 – PR23 AM Concurrence Review
SLPR23B3 – PR23 HQ Concurrence Draft

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M2KM
PSS Title: Yucca Mountain Project Plan Annual Update
(YMP Plan Annual Update)

WBS Number: 1.2.22.6.4 **DECISION DOCUMENTATION REQUIRED – YES___NO__X_**
Product: License Application
Subproduct: Technical and Regulatory Implementation
Scheduled Date: 09/28/01
Milestone Level: M2

Milestone Description:

Description/Content: The YMP employs a multi-year planning process to define the work scopes, deliverables, schedules, and estimated costs for all remaining work required to meet the Project and Program objectives. The YMP Plan is updated annually prior to the start of a new fiscal year using the "rolling wave" approach in which the near-term work is planned in detail in Work Packages and the far-term work is captured in less detail in Planning Packages. Planning data from the Work Packages and Planning Packages are summarized into Control Accounts. The annual update to the YMP Plan includes three levels of planning documentation: (1) detailed planning documentation; (2) summaries of the detailed plans; and (3) changes to the Project Summary Schedule (PSS) that reflect the roll-ups of the detailed plans.

The detailed planning documentation includes: (a) Control Account documentation contains a summary statement of work covering the duration of the account; time-phased budget by fiscal year; a list of subordinate Work Packages and Planning Packages; a list of all deliverables; and descriptions, completion criteria, acceptance Method, and completion dates for Work Package deliverables; (b) Work Package documentation by Affected Organization that includes the statement of work; a list of technical assumptions and requirements; cost estimate and estimating rationale; time-phased budget by fiscal year; and a list of all deliverables, including descriptions, completion criteria, acceptance Method, and completion dates; (c) Planning Package documentation that includes a general statement of work; an initial list of technical assumptions and requirements; cost estimate and estimating rationale; time-phased budget by fiscal year; an initial list of deliverables, including titles, preliminary descriptions, and forecasted completion dates; and (d) bar chart schedules of Work Package and Planning Package activities taken from the Integrated Project Schedule.

Additional summaries of the planning documentation include: (a) multi-year cost summaries by third level of the WBS; (b) cost summaries by Affected Organization for the execution fiscal year; (c) list of all YMP Level 0, 1, 2 and 3 milestones and completion dates; and (d) the Integrated Project Schedule.

Changes to the PSS may be required to ensure consistency with the detailed planning documentation. If necessary, changes to the PSS may include: (a) new or revised PSS activity descriptions; (b) new or revised PSS milestone/deliverable descriptions, completion criteria, acceptance Method, or completion dates; (c) new or revised logic relationships for the PSS activities; and (d) schedule bar charts showing the revised PSS activities.

Planning must have adequate level of detail to support the OMB 5-year budget cycle with Statements of Work at Work Breakdown Structure third level and this calendar year.

Acceptance Method:

The plan is accepted upon signing of the baseline Change Request.

Key Predecessor Milestones:

M2JR – YMP Plan Annual Update

Key Successor Milestones:

YMP Plan Annual Update (No ID# assigned for 2002)

Supporting Level 3 Milestones:

Submit Final YMP Plan Update to YMSCO
Submit Change Request to YMSCO to baseline YMP Plan Update

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M2KV
PSS Title: YMSCO Accepts Electronic Information System

WBS Number: 1.2.22.6.3 **DECISION DOCUMENTATION REQUIRED – YES__X_NO___**
Product: License Application
Subproduct: Technical and Regulatory Implementation
Scheduled Date: 01/31/01
Milestone Level: M2

Milestone Description:

YMSCO will accept the electronic information system that will be the basis for the certification required under 10 CFR Part 2 to provide electronic access to the record that will be the basis for site recommendation and licensing. Acceptance for further evaluation and certification to the NRC will be based on an AP-7.5Q review.

Acceptance Method:

The milestone will be complete when the system has been accepted for further evaluation based on a AP-7.5Q review to determine if the system meets the requirements of applicable DOE guidance and is consistent with the requirements of 10 CFR Part 2 relating to access and the records to be included.

Key Predecessor Milestones:

Key Successor Milestones:

M2JV – DOE Certificate of Compliance with 10CFR Part 2, Subpart J

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2MA
PSS Title: YMSCO Delivers Progress Report 24 to DOE Headquarters
(YMSCO Delivers PR24 to DOE Headquarters)

WBS Number: 1.2.22.1.3 **DECISION DOCUMENTATION REQUIRED – YES__NO__X_**
Product: License Application
Subproduct: General Information
Scheduled Date: 08/10/01
Milestone Level: M2

Milestone Description:

The Progress Report is issued every six months as required by the Nuclear Waste Policy Act and it will describe the nature and extent of site characterization activities and shall contain the information required by 10 CFR 60.18(g) or the final 10 CFR 63. The document has been reviewed by M&O and USGS management for completeness, accuracy, and agreement with current DOE policy and all comments resolved. All comments received informally from HQ during the AM review period are resolved to the satisfaction of the HQ reviewer. All sections are complete, including the list of references. One copy of resolved comment sheets from the AM concurrence review will accompany the HQ concurrence copy.

Acceptance Method:

Receipt of PR 24 at DOE headquarters.

Key Predecessor Milestones:

M2KE – YMSCO Delivers PR23 to DOE Headquarters

Key Successor Milestones:

M1YT – OCRWM Accepts Progress Report 24

Supporting Level 3 Milestones:

SLPR24A3 – PR 24 Interactive Draft
SLPR24M3 – PR24 AM Concurrence Review
SLPR24B3 – PR24 HQ Concurrence Draft

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2MK
PSS Title: Submit Consideration Hearings Comment Summary Headquarters Approval (Submit Consid.Hearings Comment Sum. HQ Approv.)

WBS Number: 1.2.21.4 **DECISION DOCUMENTATION REQUIRED – YES_X_NO___**
Product: Site Recommendation
Subproduct: Summary of Views and Nuclear Regulatory Commission Sufficiency Comments
Scheduled Date: 05/25/01
Milestone Level: M2

Milestone Description:

DOE will announce and conduct public hearings in the vicinity of the Yucca Mountain site for the purposes of informing the residents of the area of DOE's consideration of recommending approval of the site to the President and receiving their comments regarding the possible recommendation. A Consideration Hearings Comment Summary will be prepared as part of SR Report Vol. 3 following the Consideration Hearings comment period. This document will summarize the comments received and corresponding responses.

These public comments will be categorized and summarized into common topics and issues and logged into a database for tracking and dispositioning. Summary responses will be developed for each of the summary topics and issues raised in the public comments. The comment summaries must accurately and completely reflect the content of the original public comments. The summary responses must adequately address each of the summary comments. Any formal DOE commitments arising from these comments must be identified and entered into the commitments management system.

These public comments are part of the basis to be used by the Secretary in making the decision on whether or not to recommend the site to the President.

Acceptance Method:

The following expectations would be met for completion of this document:

- Demonstration that all public comments have been logged into a tracking database and filed such that they are retrievable.
- Documentation that all comments, views, issues, and concerns have been captured and included in the summary comment topics.
- Summary responses have been developed for each of the summary comment topics that are relevant to the SR.
- Summary responses completely and accurately address each of the summary comment topics.
- Summary responses are consistent with responses developed for comments from other entities (e.g., the views and comments of the States and affected tribes under NWPA Section 114(a)(1)(F).
- Summary responses are consistent with DOE technical, legal, and policy positions.
- Any formal DOE commitments arising from the summary responses are identified and entered into the comments, commitments, and decisions database.
- Summary responses show which public comments are addressed by that response.

Key Predecessor Milestones:

M1BD – Complete SR Consideration Hearings
M1BE - Close Public & State Comment Period f/SR Consideration

Key Successor Milestones:

M2NG – YMSCO Submits Complete SR Report for DOE Review

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2NG
PSS Title: YMSCO Submits Site Recommendation for DOE Concurrence
(YMSCO Submits SR for DOE Concurrence)

WBS Number: 1.2.21 **DECISION DOCUMENTATION REQUIRED – YES__NO_x__**
Product: Site Recommendation
Subproduct: Basis for Recommendation, YM Site Char. & Repository Design, Suitability Criteria Compliance Evaluation, and Summary of Views and NRC Sufficiency Comments
Scheduled Date: 06/05/01
Milestone Level: M2

Milestone Description:

For planning purposes, the submittal will consist of four SR volumes, together with the final Environmental Impact Statement, and will address the following requirements of NWPA 114(a)(1): A) a description of the proposed repository, including preliminary engineering specifications for the facility, B) a description of the waste form or packaging material proposed for use at the repository, and an explanation of the relationship between the waste form or packaging and the geologic medium of the site, C) a discussion of the data obtained in site characterization activities relating to the safety of the site, D) preliminary comments of the Nuclear Regulatory Commission concerning the extent to which the at-depth site characterization analysis and the waste form proposal for the site seem to be sufficient for inclusion in any application to be submitted for licensing, E) the views and comments of the Governor and legislature of any State, or the governing body of any designated affected Indian tribe, with the Secretary's response to these views and comments, F) any impact report submitted by the State of Nevada and designated affected Indian tribe, and G) any other information the Secretary considers appropriate.

Acceptance Method:

This milestone is complete following submittal of the complete SR for DOE concurrence.

Key Predecessor Milestones:

M1BB - OCRWM Rel SRCR for Public Review
MXJA – DOE Receives NRC Sufficiency Comments
M2MK – Submit Comment Summary Document
M1RH – OCRWM Submits PFEIS for Final DOE Concurrence

Key Successor Milestones:

M1BH– OCRWM Completes DOE Review and Concurrence of SR

Supporting Level 3 Milestones:

TBDM3 – Submit Draft SR (Vols. 1-3) to YMSCO

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2NW
PSS Title: Total System Performance Assessment – Site Recommendation – Revision 01 (TSPA-SR Rev. 01)

WBS Number: 1.2.21.3.2 **DECISION DOCUMENTATION REQUIRED – YES__X_NO___**
Product: Site Recommendation
Subproduct: Suitability Criteria Compliance Evaluation
Scheduled Date: 04/13/01
Milestone Level: M2

Milestone Description:

TSPA-SR Rev. 01 will be used to support the Site Recommendation process and the final suitability evaluation. TSPA-SR Rev. 01 will provide a reasonable estimate of the long-term behavior of the total repository system. TSPA-SR Rev. 01 will include models for all potentially significant features, events, and processes that may affect the ability of the site and EBS to contain/isolate radioactive waste. These models will represent the understanding of these features, events and processes and will explicitly address the level of uncertainty in this understanding.

TSPA-SR Rev. 01 will update TSPA-Rev. 00. These models will be revised based on more recent information and data, where required, based on the results of impact analyses. Where appropriate and warranted, these models will be conservative. The total repository system that will be analyzed includes all aspects of the SR Conceptual design (waste package, engineered barrier segment and repository), the site conditions that potentially impact the containment and isolation of radionuclides from the biosphere, and the biosphere itself.

Analyses will be performed to support the final suitability evaluation. Sensitivity analyses will be conducted, above those conducted in TSPA-SR Rev. 00. These sensitivity analyses will address potential issues that may be raised in public review of TSPA-SR Rev. 00, the draft Site Recommendation, and review of the Draft Environmental Impact Statement.

The analyses and documentation of TSPA-SR Rev. 01 will be based on the approach defined in the TSPA-SR Methods and Assumptions (M&A) document. Analyses and models documented in the Analysis and Model Reports (AMRs) and the PMRs will be utilized as necessary in the TSPA analyses and documentation. Documentation of the abstractions from the process models will be included in the PMRs. A stand-alone document will be produced. It will include all documentation needed to support the final suitability evaluation and the Site Recommendation. The document will be reviewed by all affected M&O organizations prior to completion of the Milestone.

Briefings addressing the progress/status of activities leading to the successful, on-time completion of this milestone will be conducted. Briefings will be to applicable YMSCO personnel by key M&O Performance Assessment managers, and will be supported with material suitable for YMSCO videoconference interactions with OCRWM semi-annual briefings addressing the progress/status of activities leading to the successful, on-time completion of the milestone will be conducted.

Acceptance Method:

This milestone will be completed following the AP-7.5Q review of the supporting Level 3 Milestone and resolution of all comments.

Key Predecessor Milestones:

M2JG- TSPA-SR Rev. 00

Key Successor Milestones:

M2NY – TSPA-LA
M2NG – YMSCO Submits Complete SR for DOE Review
M2__ - TSPA-LA Methods and Assumptions Document

Supporting Level 3 Milestones:

SL924M3 – TSPA-SR Rev. 01

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2RD
PSS Title: Project Manager Signs Final Environmental Impact Statement Mitigation Action Plan
(Project Mgr. Signs FEIS Mitigation Action Plan)

WBS Number: 1.2.20.2 **DECISION DOCUMENTATION REQUIRED – YES___NO__X_**
Product: Environmental Impact Statement
Subproduct: Post EIS Completion Activities
Scheduled Date: 04/30/02
Milestone Level: M2

Milestone Description:

Support DOE to prepare the FEIS Mitigation Action Plan (MAP), including the preparation of material necessary to prepare the MAP.

Acceptance Method:

Deliver material to AMLRC, which is necessary to the preparation of the FEIS MAP in accordance with applicable requirements of the deliverable description and AP-7.5Q. This milestone will be considered accepted by DOE when it has completed the AP-7.5Q review.

Key Predecessor Milestones:

M0AA – Publish Notice Of Availability for the FEIS

Key Successor Milestones:

Supporting Level 3 Milestones:

SSJ20AM3 Submit Draft Mitigation Action Plan for Headquarters, Sites, and YMSCO Review

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Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2SL
PSS Title: Near Field Environment Process Model Report, Revision (Near Field Environment PMR, Rev.)

WBS Number: 1.2.22.4.N **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 01/31/02
Milestone Level: M2

Milestone Description:

The NFE PMR for LA will be a revision of the PMR prepared for the SR. The content of the PMR is not expected to be significantly different in scope. The NFE PMR for LA will incorporate the data, associated analyses/interpretations, and model updates that became available from the on-going thermal tests since the SR data-cut off date. These ongoing thermal tests were identified in the PMR for SR and are listed below. In addition, the NFE PMR for LA will incorporate the data, associated analyses/interpretations, and model updates that result from new thermal tests started since the SR cutoff date. These thermal tests are also identified below.

The NFE PMR is a synthesis of both the in-situ thermal testing and the coupled process models/analyses that provides an integrated overview of the thermally-driven, coupled processes in the geosphere that affect the thermal-hydrological-chemical-mechanical environment of the drifts. The PMR will reference AMRs prepared under other process model development activities. This NFE PMR will contain sufficient detail to enable a reader to find a clear explanation of performance of those components commonly associated with the NFE, especially as done in the NRC's Issue Resolution Status Report on the NFE. The PMR will reference other PMRs for detailed discussions of the near-field processes. An important function of this NFE PMR will be to demonstrate integration of the various near-field processes and serve as the focal point for transparency and traceability in the evaluations of near-field processes.

The list of AMRs that are currently in the schedule as directly supporting the NFE PMR will remain as is and will be addressed in the PMR. The NFE PMR will refer to other PMRs, as appropriate, for detailed discussions of other NFE processes and models. All AMRs referenced in the PMR must be complete and available at the time of PMR submittal to DOE for formal review.

The PMR development activity will integrate available thermal test data and the relevant conceptual and numerical model developments incorporating the site-specific characteristics under the thermal effects. The source of the available data will include specifically those listed below.

The PMR will be developed in accordance with the QARD and using approved QA procedures for analysis and modeling such that the conclusions in the PMR and the sub-models can be followed back through completely to the supporting data. Traceability to particular data and parameter sets (in the database) on which model revisions are based, need to be provided to the general user.

Testing that supports this PMR may continue beyond completion of the PMR as part of the Performance Confirmation Program. Development and maintenance of the Performance Confirmation Program Plan is covered under WBS 1.2.22.5.2. Performance Confirmation Testing

and Assessment, WBS 1.2.22.4.7, will cover any testing that is conducted as part of the performance confirmation program. A final review of the field experimentation program results should be performed at as late as possible a date to assure that the most current field and experimental results do not contradict the conceptual models and assumptions of the NFE PMR.

Acceptance Criteria:

1) The technical content of the PMRs meets the requirements identified in the scope of work definition and is complete, clearly written, defensible, and traceable to the supporting AMRs so that independent reviewers can understand and verify how data sets were used in AMRs, PMRs and the abstractions that support TSPA-SR.

2) The qualification status of all data is clearly and correctly identified. All PMRs will be reviewed and evaluated to verify that, for all technical data (as defined in AP SIII.3Q) in the deliverable:

    a) The data cited in the PMR and supporting AMRs are included in the controlled Technical Information Management System and are labeled qualified, accepted, or unqualified in accordance with the YMP quality assurance program. The PMRs will identify results of analyses supporting the postclosure safety case that utilize, in whole or in part, unqualified data.

    b) DOE understands that the technical basis for the postclosure safety case for the License Application (LA) needs to be supported by qualified data and software and by validated models. As part of the Process Model Reports (PMRs) and their supporting Analysis and Model Reports, a focused process has been put in place to show demonstrable progress toward this goal over the next few years. By the time Revision 0 of the PMRs are completed (May 2000) in support of the Site Recommendation Consideration Report, at least 50 percent of the supporting data will have been verified (i.e., its Q status identified) and at least 40 percent of the data needed to be qualified will have been qualified. By that same time, at least 40 percent of the supporting software will have been qualified and at least 40 percent of the models validated. By the time Revision 1 of the PMRs are completed (January 2001) in support of the Site Recommendation, at least 90 percent of the supporting data will have been verified, at least 80 percent of the data needed to be qualified will have been qualified, at least 80 percent of the supporting software will have been qualified, and at least 80 percent of the models validated. DOE believes this process supports the NRC's schedule for providing sufficiency comments for the Site Recommendation. The process will be completed, based on the Repository Safety Strategy, prior to submittal of the LA.

    c) Unqualified data supporting the postclosure safety case requiring qualification will be identified.

    d) Within the PMR or a cover letter provide a complete list of DTNs and Q-status for data, analyses, model input and output, and software used directly in the PMR and in the supporting AMRs or other supporting analyses.

3) All software code used in development and/or control of resulting models or manipulation of data presented in the PMR, supporting AMRs, and other supporting analyses is qualified and maintained in accordance with applicable procedures controlled by the M&O. A listing of the location of software and status for the PMR and supporting AMRs and other supporting analyses will be provided in the PMR or as a cover letter. All PMRs will be reviewed and evaluated to verify that:

    a) All software codes used in development of models that are documented in the deliverable have been assigned a unique identifier and are maintained in accordance with applicable procedures.

b) All software codes used to develop or manipulate the data presented in the deliverable have been assigned a unique identifier and are maintained in accordance with applicable procedures.

c) The software code is retrievable and usable, and the results reported in the deliverable are reproducible.

4) All models used in the development of the PMR and supporting AMRs will be qualified and maintained in accordance with applicable procedures.

5) Documentation of the following is provided:

a) The user-defined input parameters (parameter values) that are used to run the codes/software that are used to support TSPA-SR.

b) The actual numerical value/distribution used for each parameter and the rationale for its selection.

c) The source(s) for each parameter value and any intermediate calculations/data manipulations used to determine the parameter value.

6) Alternate conceptual models and alternate interpretations of the available data are documented.

7) A discussion of relevant analog information is included and documented.

8) All assumptions and their bases are identified and justified.

9) PMR development must fully address regulatory requirements, commitments, and expectations as presented in this element sheet. The PMR and report on remaining work will include the following features:

a) Common graphics: The graphics will be consistent and, where possible, identical in order to facilitate integration among the analyses and models supporting the PMR. The graphics will be clear and accurate, and reflect the accompanying text descriptions.

b) Readability: The text will be clear, simple and concise. Avoid the use of technical jargon and acronyms whenever possible and in line with the need for the SR and LA presentation needs.

c) Full M&O Management Review: Each draft or final document submitted for DOE review and acceptance shall have received a full M&O management review.

d) Project generated data cited in deliverables in the format of graphics, tables, figures, parameter values, and maps must include the Data Tracking Number for the cited data. DTNs cited in the body of the text should be included in the reference section of the document. The data cited by DTN must be resident in the TDMS. Data or information from other sources must have appropriate Technical Information Management System identifiers (e.g., TIC or RIS number) and be accessible through the TIMS.

Acceptance Method:

The Product Manager will notify the Project Manager by letter of the decision on the NFE Model to be used for LA.

Key Predecessor Milestones:

M2NW – TSPA-SR (Rev. 01)

Key Successor Milestones:

M2NY – TSPA-LA

Supporting Level 3 Milestones:
SLEB145M3 - EBS PMR Rev00
SLPMRWM3 - Waste Form PMR Rev00
SLFR0LM3 - WPD PMR Rev00
SLP593M3 - UZ PMR Rev00
SL200MM3 - Complete TSPA-LA Document

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2SN
PSS Title: Waste Package Degradation Process Model Report, Revision (Waste Package Degradation PMR, Rev.)

WBS Number: 1.2.22.4.P **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 01/31/02
Milestone Level: M2

Milestone Description:

Scope of Waste Package Materials Degradation PMR should, at a minimum, address the following as necessary for Alloy 22, stainless steel, titanium, candidate basket materials, ex-container materials, and any other materials necessary for comparative purposes:

- Establish baseline material properties and characteristics
- Long term aqueous and humid air corrosion rates
- MIC
- Phase stability
- Radiolysis Enhanced Corrosion
- SCC
- Hydrogen Embrittlement
- Corrosion environment

Waste Package Materials Degradation PMR must demonstrate compliance with applicable acceptance criteria (general and specific) as presented in available versions of the Container Life/Source Term IRSR and/or what activities are planned/ongoing to demonstrate compliance.

The PMR scope includes implementation of the August 16, 1999, letter from Dr. Daniel Wilkins to Dr. Stephan Brocoum and Mr. Richard Spence describing the replan of the NFE PMR and the resulting assignment of certain AMR(s) to this PMR.

The work scope for preparation, review, and revision of LA chapters or sections that describe information presented in the PMR is covered under WBS 1.2.22.4.1, TSPA Input for LA.

Materials testing activities may continue beyond completion of the PMR as part of the Performance Confirmation Program. Development and maintenance of the Performance Confirmation Program Plan is covered under WBS 1.2.22.5.2. Testing and related analyses are covered under WBS 1.2.22.4.7, Performance Confirmation Testing and Assessment.

Ensure that all data used and models developed in this PMR are consistent among PMRs and other relevant documentation.

The scopes of work for modifying this PMR is dependent on the extent of modification. Limited changes that reflect data qualification status and/or modification due to comments will result only in an ICN as defined in AP-5.1Q. Modifications including new data and analyses that may affect results of model outputs may require a formal revision of the PMR. The guidance presented here assumes a formal revision of the PMR; however, the decision to proceed with a revision of the PMR remains with DOE.

Acceptance Method:

The Product Manager will notify the Project Manager by letter of the decision on the Waste Package Degradation Model to be used for LA.

Key Predecessor Milestones:

M2NW – TSPA-SR (Rev. 01)

Key Successor Milestones:

M2NY – TSPA-LA

Supporting Level 3 Milestones:

TBD

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2SP
PSS Title: Saturated Zone Flow and Transport Process Model Report, Revision (Saturated Zone Flow and Transport PMR, Rev.)

WBS Number: 1.2.22.4.S **DECISION DOCUMENTATION REQUIRED - YES_X_ NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 03/01/02
Milestone Level: M2

Milestone Description:

Update as essential the latest version SZ Flow and Transport PMR and associated documentation of the SZ flow and transport model to support the latest version of the TSPA-LA.

The SZ PMR is a synthesis report on the SZ flow and transport conditions at the site. The synthesis will be based on the key relevant flow and transport components of the models. The SZ PMR will summarize the relevant components including, but not limited to, water level data, hydrogeologic framework data, regional scale model, recharge data, boundary conditions, ATC single well and multi-well testing and data synthesis, transport methodology, hydrochemistry, dilution characterization, NCEWD Program, and input from the SZ model.

The following submodels, analyses, and their TSPA abstractions may require revisions, as necessary, and submitted as supporting documentation of the PMR deliverable.

- Final Calibrated Flow Model–Update with new available data.
- Water Level Data Analysis–Update with new available data.
- Development of Flow Boundary Conditions–Update with new available data.
- Analysis of the Saturated Zone Hydrochemistry–Update with new available data.
- Abstraction of Colloid-Facilitated Pu Transport Modeling–Update with new available data.
- Hydrogeologic Framework Model– Update with new available data.
- Probability Distribution for Flowing Interval Spacing–Update with new available data.
- Uncertainty Distributions for Stochastic Parameters–Update with new available data.
- Inputs and Results of Base Case SZ Flow and Transport Model Runs for TSPA–Update with new available data.
- FEPs–Update with new available data.

The associated testing and analyses are identified below. These testing and analyses were identified based on an evaluation of the testing and analyses needs for the principal factors in the VA Volume 4, as modified by RSS Revision 4, or other documented basis for change.

The work scope shall include the following science activities. The PMR will be revised as new and significant flow and transport test and validation data become available, in order to support design and TSPA. The work scope for preparation, review, and revision of LA chapters or sections that describe information presented in the PMR is covered under WBS 1.2.22.4.1, TSPA Input for LA. The support needed for testing activities are described in Testing and Monitoring Activities of the Technical Support Subproduct, WBS 1.2.22.6.T:

- Alluvial/Volcanic Aquifers Tracer Complex Testing: The alluvial tracer complex will consist of a configuration of wells in which reactive and conservative tracer tests and companion

hydraulic tests will be performed to determine flow and transport parameter studies. The primary testing area will be determined through analysis of the data provided by the NCEWDP, use of geophysical data and through exploratory drilling by the project. The tests shall provide hydraulic parameters and sorption/attenuation from depth and strata intervals not intensively investigated to date. This shall at least include the saturated alluvium and optimally include both the upper volcanic aquifer/alluvial aquifer interface. The testing will include full site-characterization chemical analysis in addition to tracer testing analytical protocol. This testing shall at least include Eh/pH testing, isotopic testing and inorganic testing. The testing shall demonstrate whether the total concentration of tracers is reduced by hydraulic and tracer testing. These tests will allow direct measurement of the reduction in concentration of tracers as they travel from one point of release at the water table to a pumping well.

- SZ Hydrochemistry: Hydrochemistry data will be obtained using water samples collected from wells to the south of Yucca Mountain in Amargosa Valley, in cooperation with Nye County and the USGS, Nevada District; Inyo County Wells; and wells on the Nevada test Site, in cooperation with DOE/Nevada. Additionally, these requirements also apply to additional boreholes at Yucca Mountain. The analytical parameters will be oxidation/reduction potential, alkalinity, and pH will be measured in situ, and oxidation/reduction couples will be evaluated using laboratory chemical analysis for major, minor, and trace element abundance. Additional hydrochemical work scope includes carbon-14 dating of groundwater in wells closer to Yucca Mountain and verification of samples previously obtained in Forty-Mile Wash.
- Site-Scale SZ Flow and Transport Model: Update the site-scale model to include revised hydrostratigraphic data from drilling activities south of Yucca Mountain; Hydraulic and transport testing results from the ATC, results from any ongoing hydraulic tests in new and existing wells/boreholes; regional hydrochemistry and isotopic results, including apparent groundwater age, oxidation/reduction potential, pH, and chemical analyses; and hydraulic, geologic, Inyo County Wells, and hydrochemical data from the NCEWDP wells. Additionally, the model shall include results from colloid studies performed at Sandia National Labs and sorption studies at Los Alamos National Lab. The model results will be abstracted for use in the TSPA for the LA and for evaluation of model sensitivity and uncertainty. Sensitivity analyses will include evaluation of transport of radionuclides following early failure of one, or a small number of, separated waste packages. Natural and man-made analogs will be used to build confidence in models of water movement through the saturated zone at site scale.
- Regional-Scale SZ Flow Model: Update the Regional-Scale Model to include revision of regional hydrostratigraphic data from planned geologic mapping south of Yucca Mountain, hydrostratigraphic results from the NCEWDP, Inyo County Wells, hydrostratigraphic results from boreholes at Yucca Mountain and associated Nevada Test Site Environmental restoration Program, and stratigraphy information obtained from existing geophysical survey data. Results of the model will be used in the TSPA for updates to the LA and for evaluation of model sensitivity and uncertainty.
- Measure K_ds in Alluvium and Provide Support to the LA: Sorption testing will be performed on samples recovered from the Nye County boreholes to aid in understanding transport in the alluvium. Results will aid in the performance assessment abstraction and sensitivity analysis of the saturated zone transport model after the model is delivered to performance assessment, and during the development of the TSPA for the LA.
- Additional Boreholes: Additional boreholes to support SZ testing and monitoring for LA requirements (to include Nye County and Inyo County Wells). The methods and results of abstractions of the relevant models and components for TSPA will be summarized.

Some of the testing activities may continue beyond completion of the PMR as part of the Performance Confirmation Program. Development and maintenance of the Performance Confirmation Program Plan is covered under WBS 1.2.22.5.2. Performance Confirmation Testing and Assessment, WBS 1.2.22.4.7, will cover any testing and analyses conducted as part of the performance confirmation program.

Earth Vision Format–In coordination with the ISM activities, develop and maintain model translation capability in Earth Vision format for all process models.

The revision of the SZ Flow and Transport PMR is due to the DOE for acceptance review in accordance with the criteria stated below.

Ensure that all data used and models developed in this PMR are consistent among PMRs and other relevant documentation.

The scopes of work for modifying this PMR are dependent on the extent of modification. Limited changes that reflect data qualification status and/or modification due to comments will result only in an ICN as defined in AP-5.1Q. Modifications including new data and analyses that may affect results of model outputs may require a formal revision of the PMR. The guidance presented here assumes a formal revision of the PMR; however, the decision to proceed with a revision of the PMR remains with DOE.

Acceptance Method:

The Product Manager will send a letter to the Project Manager stating acceptance of the SZ Flow and Transport Model for the SR.

Key Predecessor Milestones:

M2NW – TSPA-SR (Rev. 01)

Key Successor Milestones:

M2NY – TSPA-LA

Supporting Level 3 Milestones:

SPV248M3 – SZ Flow & Transport Model for SR

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2SR
PSS Title: Integrated Site Model Process Model Report, Revision (Integrated Site Model PMR, Rev.)

WBS Number: 1.2.22.4.I **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 11/15/01
Milestone Level: M2

Milestone Description:

The three-dimensional Integrated Site Model of Yucca Mountain, Nevada, will be an updated geometric representation of selected rock units and structures (a geologic framework model) plus a set of rock properties and mineralogy models and data sets. The updated Integrated Site Model PMR will provide a summary and synthesis of the following component models: Geologic Framework Model; Rock-Properties Model; and the Mineralogy-Petrology Model. The summaries will include discussions of the following: descriptions of the models, supporting codes, components, and/or analyses; the latest available input data and its qualification status; data, code, and model validation; model construction; model results and feeds to users (e.g., design, UZ and SZ flow and transport); model uncertainties; and credible alternative interpretations. The Integrated Site Model PMR for LA will be an updated and revised version of the PMR prepared for Site Recommendation. The content of the LA version of the ISM PMR is not expected to be significantly different in scope but will incorporate possible new data from field tests and analyses results that become available after the SR data cut-off date, as well as possible responses to comments on the current revision of the PMR.

The work scope for preparation, review, and revision of LA chapters or sections that describe information presented in the Integrated Site Model PMR is covered under WBS 1.2.22.4.1, TSPA Input for LA.

Some of the testing activities may continue beyond completion of the ISM PMR as part of the Performance Confirmation Program. Development and maintenance of the Performance Confirmation Program Plan is covered under WBS 1.2.22.5.2. Performance Confirmation Testing and Assessment, WBS 1.2.22.4.7, will cover any testing that is conducted as part of the performance confirmation program.

Data and models shall be submitted to the Technical Data Management System in compliance with appropriate procedural processes. The capability to translate changes to the static Integrated Site Model properties in Earth Vision format, compatible with model translations from design, the UZ, and SZ will be maintained in preparation for LA. Information should be included in the Integrated Site Model PMR that tracks the Integrated Site Model static properties to the technical database and/or the model warehouse.

Ensure that all data used and models developed in this PMR are consistent among PMRs and other relevant documentation.

The scopes of work for modifying this PMR is dependent on the extent of modification. Limited changes that reflect data qualification status and/or modification due to comments will result only in an ICN as defined in AP-5.1Q. Modifications including new data and analyses that may affect results of model outputs may require a formal revision of the PMR. The guidance presented here

assumes a formal revision of the PMR; however, the decision to proceed with a revision of the PMR remains with DOE.

Acceptance Method:

The Product Manager will notify the Project Manager by letter of the decision on the ISM Model to be used for LA.

Key Predecessor Milestones:

M2NW – TSPA-SR Rev. 01

Key Successor Milestones:

M2NY – TSPA-LA

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2SS
PSS Title: Engineered Barrier System Degradation Process Model Report, Revision (EBS Degradation PMR, Rev.)

WBS Number: 1.2.22.4.E **DECISION DOCUMENTATION REQUIRED - YES__X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 03/01/02
Milestone Level: M2

Milestone Description:

The EBS Degradation, Flow, and Transport PMR addresses the processes important to the manner in which moisture enters and exits the drift and how radionuclides can begin to move toward the biosphere once the engineered barrier system has been degraded. The PMR describes colloid formation and stability (an important consideration in evaluating the ability of colloids to transport radionuclides) and movement of radionuclides through the remaining engineered barrier components.

The PMR will be supported by approximately 23 analysis and model reports that pertain to the following:

- The physical and chemical environment surrounding the waste package and drip shield.
- Water distribution and removal within the drift.
- The transportation of radionuclides within the drift.
- Degradation of the emplacement drift.

The PMR utilizes inputs from other PMRs, especially Waste Package Degradation, Waste Form Degradation, and UZ Flow and Transport, and outputs to UZ Flow and Transport, EBS design, and TSPA. The emphasis of the discussion of model inputs and outputs is on information needed for the assessment of postclosure performance.

The work scope for preparation, review, and revision of LA chapters or sections that describe information presented in the EBS PMR is covered under WBS 1.2.22.4.1, TSPA Input for LA.

Results from testing on drip shields, material column tests, and introduced materials tests shall be included in the EBS Degradation, Flow and Transport PMR as supporting documentation. However, separate test summary reports will be prepared as deliverables for the following tests:

- Seismic Testing of Engineered Barrier Systems
- Drip Shield Joint Configuration Tests
- Drift Drainage Field Tests

Field data acquisition and test support are covered under Testing and Monitoring, WBS 1.2.22.6.T.

Some of these testing activities may continue beyond completion of the PMR as part of the Performance Confirmation Program. Development and maintenance of the Performance Confirmation Program Plan is covered under WBS 1.2.22.5.2. Performance Confirmation Testing

and Assessment, WBS 1.2.22.4.7, will cover any testing that is conducted as part of the performance confirmation program.

The project has committed to supply the NRC data in Earth Vision format which they can use for the LA. An Earth Vision data set will be prepared (translated and verified) for transmittal to the NRC from the integrated design framework prepared in Vulcan for use in the SR. The Vulcan model was required for use in the SR to facilitate portrayal of engineering design data in conjunction with the Integrated Site Model developed in Earth Vision.

Ensure that all data used and models developed in this PMR are consistent among PMRs and other relevant documentation.

The scopes of work for modifying this PMR are dependent on the extent of modification. Limited changes that reflect data qualification status and/or modification due to comments will result only in an ICN as defined in AP-5.1Q. Modifications including new data and analyses that may affect results of model outputs may require a formal revision of the PMR. The guidance presented here assumes a formal revision of the PMR; however, the decision to proceed with a revision of the PMR remains with DOE.

Acceptance Method:

The Product Manager will notify the Project Manager by letter of the decision on the EBS Model to be used for LA.

Key Predecessor Milestones:

M2NW – TSPA-SR (Rev. 01)

Key Successor Milestones:

M2NY – TSPA-LA

Supporting Level 3 Milestones:

TBD

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2ST
PSS Title: Biosphere Process Model Report, Revision (Biosphere PMR, Rev.)

WBS Number: 1.2.22.4.B **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 02/15/02
Milestone Level: M2

Milestone Description:

Revise the Biosphere PMR based on new information gathered during analyses and modeling activities. Revision of the model will be predicated on two factors:

- The availability of additional data and/or process level modeling results and whether this data and/or process level modeling results in significant changes to the results contained in TSPA-SR, Revision 01.

- Comments received from various sources including review of the SR document and TSPA-SR, Revision 01.

Description

The Biosphere PMR revision for LA is a synthesis report. It should address the characteristics of the environment that influence the transport of radionuclides to man. It includes a description of the lifestyle and habits of individuals who would be exposed to radioactive material at some time during the postclosure performance period. The PMR should describe the reference biosphere, associated pathways and the characteristics of the average member of the critical group and the reasonably maximally exposed individual including the location and behavior representative of current conditions, and biosphere transport and uptake parameters used. The PMR should also consider processes responsible for radionuclide buildup and depletion in soils, as well as dose assessment. This PMR should address water usage by the community in which the receptors of interest reside.

The Biosphere PMR shall incorporate all new data into the calculations, analyses and/or models, update conceptual submodels of radionuclide transport in the biosphere, and concentrate on refinement of specific features, events and processes of the biosphere which are considered to be important to the assessment of repository performance. The PMR should also include biosphere analyses and modeling activities required to finalize the Biosphere Dose Conversion Factors that are consistent with the Nuclear Regulatory Commission's concept of the critical group, the Environmental Protection Agency's concept of the reasonably maximally exposed individual, and the reference biosphere for each.

This report will primarily reference supporting analyses and documents developed outside the Project. Each of the analyses, models, and/or calculations that are related to the Biosphere PMR for LA shall be documented in accordance with AP-3.10Q, Analyses and Models, and other applicable procedures. This documentation should be summarized in the PMR, but need not be physically part of the report.

In revising the Biosphere PMR and the supporting analyses, models, and/or calculations, the subject matter experts shall be cognizant of existing documentation (internal and external) that is related to the process model to ensure that the depth and breadth of the available technical information is adequately considered.

This revised report should document the conceptual and numerical models used to describe or interpret the Biosphere Model. These models should incorporate singly and multiply coupled thermal, mechanical, chemical and biological processes, as appropriate.

The model report should identify the laboratory, field and natural analogue data that serve as the basis for developing or testing the reality of the models. The report should also include reference to the codes used to implement the models. The QA status of these codes should be discussed.

The report should discuss comparisons of model predictions against laboratory or field data, as appropriate for demonstrating representativeness. The report also should discuss possible uses and limitations, sensitivities, and model uncertainties.

The Biosphere PMR and analyses shall be produced and revised following the QARD and related acceptable procedures. It shall incorporate all newly acquired data into the model components and concentrate on refinement of specific features.

The following analyses, activities, and abstractions should be revised, refined, and employed as necessary in preparation of the revised PMR:

- Develop site-specific biosphere dose conversion factors for the average member of the critical group for nondisruptive performance and disruptive events, and for the reasonably maximally exposed individual for nondisruptive performance.
- Describe the lifestyle and habits of the average member of the critical group and for the reasonably maximally exposed individual who would be exposed to radioactive material at some time during the postclosure performance period.
- Address the characteristics of the environment that influence the transport of radionuclides to humans.
- Perform inhalation exposure analysis for the average member of the critical group and for the reasonably maximally exposed individual.
- Develop soil dynamics, water usage, abstractions, sensitivities, and FEPs analyses.
- Evaluate distribution fit with regards to biosphere dose conversion factors.
- Conduct literature reviews/assemble data needed to determine transfer coefficients and environmental transport parameters.
- Conduct ingestion exposure analysis for the average member of the critical group and for the reasonably maximally exposed individual.
- Determine abstraction soil buildup on biosphere dose conversion factors.
- Evaluate available data and perform disruptive and non-disruptive sensitivity analyses.
- Assess radionuclide removal from soil analysis.
- Complete food consumption, lifestyle, and habits survey for Amargosa Valley and surrounding locations, as necessary.
- Employ peer review process to evaluate analyses and models supporting the Biosphere PMR.
- Conduct data validation and qualification.

The basis for planning must clearly indicate the level of effort required as a function of time, and include integration with affected organizations.

Ensure that all data used and models developed in this PMR are consistent among PMRs and other relevant documentation.

The scopes of work for modifying this PMR are dependent on the extent of modification. Limited changes that reflect data qualification status and/or modification due to comments will result only in an ICN as defined in AP-5.1Q. Modifications including new data and analyses that may affect results of model outputs may require a formal revision of the PMR. The guidance presented here assumes a formal revision of the PMR; however, the decision to proceed with a revision of the PMR remains with DOE.

Acceptance Method:

The Product Manager will notify the Project Manager by letter of the decision on the Biosphere Model to be used for LA.

Key Predecessor Milestones:

M2NW – TSPA-SR Rev. 01

Key Successor Milestone:

M2NY – TSPA-LA

Supporting Level 3 Milestone:

SL200MM3 – Complete TSPA-LA Document

Change Request Date:
Change Request Number:

Functional Manager:_____ **Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2SU
PSS Title: Unsaturated Zone Flow and Transport Process Model Report, Revision (Unsaturated Zone Flow and Transport PMR, Rev.)

WBS Number: 1.2.22.4.U **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 01/31/02
Milestone Level: M2

Milestone Description:

The UZ Flow and Transport PMR is a synthesis report on the UZ flow and transport conditions at the site. The synthesis will be based on the key relevant flow and transport submodels, which support a three-dimensional process model of flow and radionuclide transport.

The UZ PMR will summarize the relevant submodels, including drift seepage at ambient and thermal conditions, site-scale radionuclide transport under the ambient and thermal conditions, groundwater infiltration and climate submodel, calibrated properties model, base case flow fields, and transport properties and model results for Busted Butte. This UZ PMR will update only those existing AMRs that are affected by the data and or modeling information that became available since preparation of the most recent version of the UZ PMR.

Information from natural and man-made analogs will be used to build confidence in the submodels.

The PMR will also summarize the methodology and results of the submodel abstractions performed for the total system assessment. As discussed above, revision of the abstracted sub-system models will be predicated on two factors:

- The availability of additional data and/or process level modeling results and whether this data and/or process level modeling results in significant changes to the results contained in TSPA-SR Revision 01.

- Comments received from various sources including review of the SR document and TSPA-SR Revision 01.

The UZ PMR development activity will integrate the available data obtained from UZ investigations and compute three-dimensional flow and transport for three different climate scenarios and assumed numerical and conceptual models.

In support of design and TSPA, the PMR will be revised as new and significant flow and transport test and validation data become available.

Ensure that all data used and models developed in this PMR are consistent among PMRs and other relevant documentation.

The scopes of work for modifying this PMR are dependent on the extent of modification. Limited changes that reflect data qualification status and/or modification due to comments will result only in an ICN as defined in AP-5.1Q. Modifications including new data and analyses that may affect results of model outputs may require a formal revision of the PMR. The guidance presented here

assumes a formal revision of the PMR; however, the decision to proceed with a revision of the PMR remains with DOE.

Acceptance Method:

The Product Manager will send a letter to the Project Manager stating acceptance of the UZ Flow and Transport Model for the LA.

Key Predecessor Milestones:

M2NW – TSPA-SR Rev. 01

Key Successor Milestones:

M2NY – TSPA-LA

Supporting Level 3 Milestones:

SP3538M3 - UZ Flow & Transport Model for SR

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2SV
PSS Title: Waste Form Degradation Process Model Report, Revision (Waste Form Degradation PMR, Rev.)

WBS Number: 1.2.22.4.F **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 03/01/02
Milestone Level: M2

Milestone Description:

The scope of the Waste Form PMR should address, at a minimum:

- Establish baseline waste form properties and characteristics of glass HLW and commercial SNF
- All relevant cladding failure modes
- Bounding waste form degradation rates
- Colloid formation and stability
- Radionuclide solubility and mobilization (including transport through perforations and crevices)
- Secondary phase formation and stability
- Representation of waste form area exposed
- Natural and historical analogues

Waste Form Degradation PMR must demonstrate compliance with applicable acceptance criteria (general and specific) as presented in available versions of the Container Life/Source Term IRSR and/or what activities are planned/ongoing to demonstrate compliance.

The work scope for preparation, review, and revision of LA chapters or sections that describe information presented in the PMR is covered under WBS 1.2.22.4.1, TSPA Input for LA.

Materials testing activities may continue beyond completion of the PMR as part of the Performance Confirmation Program. Development and maintenance of the Performance Confirmation Program Plan is covered under WBS 1.2.22.5.2, Licensee Plans and Programs. The testing and related analyses are covered under WBS 1.2.22.4.7, Performance Confirmation Testing and Assessment.

Ensure that all data used and models developed in this PMR are consistent among PMRs and other relevant documentation.

The scopes of work for modifying this PMR is dependent on the extent of modification. Limited changes that reflect data qualification status and/or modification due to comments will result only in an ICN as defined in AP-5.1Q. Modifications including new data and analyses that may affect results of model outputs may require a formal revision of the PMR. The guidance presented here assumes a formal revision of the PMR; however, the decision to proceed with a revision of the PMR remains with DOE.

Acceptance Method:

The Product Manager will notify the Project Manager by letter of the decision on the Waste Form Degradation Model to be used for LA.

Key Predecessor Milestones:

M2NW – TSPA-SR (Rev. 01)

Key Successor Milestones:

M2NY – TSPA-LA

Supporting Level 3 Milestones:

TBD

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2SW
PSS Title: Disruptive Events Process Model Report, Revision (Disruptive Events PMR, Rev.)

WBS Number: 1.2.22.4.D **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 02/15/02
Milestone Level: M2

Milestone Description:

A disruptive event is defined as an event having at least one chance in 10,000 of occurring over 10,000 years per the *Revised Interim Guidance Pending New NRC Regulations*, dated July 22, 1999, as modified by the PORB on February 16, 2000. All events having a documented basis for an occurrence probability less than this will be screened out of the TSPA analyses (see Features, Events, and Processes element under TSPA-LA). The Disruptive Events PMR element involves the development of models and analyses for disruptive igneous and seismic events that will be included in the overall TSPA-LA model and analyses.

In the case of seismic and volcanic activity, the report will summarize the consequences of seismic and volcanic events that potentially could affect a geologic repository at Yucca Mountain. The consequence analyses will rely on inputs from the probabilistic seismic and volcanic hazard analyses for seismic and volcanic events, respectively, to describe the frequency of occurrence of disruptive events. Incremental effects of seismic ground motion on rockfall will be described and the consequences of ground motions and fault displacements for the engineered barrier system and waste packages will be summarized. Apply the fragility approach to the postclosure seismic analysis of key components or systems that might be affected by ground motions and fault displacements (e.g., the ground support system, drip shield, waste package). Develop fragility curves that express the probability of failure for particular components or systems for various levels of ground motion. Convolution of a fragility curve with the seismic hazard curve for the repository emplacement level results in a probability of failure relationship for a particular component or system that will be used in the TSPA-LA analyses.

Effects of igneous activity on drifts, waste packages, and waste forms will be addressed and modes of radionuclide release resulting from igneous events will be characterized. Finally, the potential effects of volcanic and seismic activity on the hydrologic system in the Yucca Mountain area will be addressed.

The Disruptive Events PMR developed for TSPA-SR will be revised, as necessary and appropriate, due to newly acquired information, changes in the qualification status of the data, or in response to comments received on the current revision of the Disruptive Events PMR, TSPA-SR (Revision 00 or 01), and the SR. The Disruptive Events PMR developed for LA will support TSPA-LA. The work scope for preparation, review, and revision of LA chapters or sections that describe information presented in the Disruptive Events PMR is covered under WBS 1.2.22.4.1, TSPA Input for LA.

Ensure that all data used and models developed in this PMR are consistent among PMRs and other relevant documentation.

The scopes of work for modifying this PMR are dependent on the extent of modification. Limited changes that reflect data qualification status and/or modification due to comments will result only in an ICN as defined in AP-5.1Q. Modifications including new data and analyses that may affect results of model outputs may require a formal revision of the PMR. The guidance presented here assumes a formal revision of the PMR; however, the decision to proceed with a revision of the PMR remains with DOE.

Acceptance Method:

The Product Manager will notify the Project Manager by letter of the decision on the Tectonics Model to be used for LA.

Key Predecessor Milestones:

M2NW – TSPA-SR (Rev. 01)

Key Successor Milestones:

M2NY – TSPA-LA

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____ **Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: MXJA
PSS Title: DOE Receives Nuclear Regulatory Commission Sufficiency Comments (DOE Receives NRC Sufficiency Comments)

WBS Number: 1.2.21.4 **DECISION DOCUMENTATION REQUIRED - YES___NO__X_**
Product: Site Recommendation
Subproduct: Summary of Views and Nuclear Regulatory Commission Sufficiency Comments
Scheduled Date: 05/25/01
Milestone Level: External

Milestone Description:

This external milestone is met by receipt of sufficiency comments from the NRC, following a formal DOE request (correspondence) for such NRC comments as required by NWPA 114(a)(1)(E).

Acceptance Method:

This milestone will be complete when preliminary sufficiency comments have been received from NRC.

Key Predecessor Milestones:

M1GV – DOE Requests NRC Sufficiency Comments

Key Successor Milestones:

M2NG – YMSCO Submits Complete SR for DOE Review

Supporting Level 3 Milestones: N/A

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2__
PSS Title: Total System Performance Assessment – License Application Methodology and Assumptions Document
(TSPA-LA Methodology & Assumptions Doc.)

WBS Number: 1.2.22.4.3 **DECISION DOCUMENTATION REQUIRED: Yes___ No__X__**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 01/31/02
Milestone Level: M2

Milestone Description:

Following the completion of Total System Performance Assessment for Site Recommendation, efforts will focus on developing Total System Performance Assessment – License Application (TSPA-LA). TSPA-LA will support the safety case that will be presented in the License Application to the U.S. Nuclear Regulatory Commission (NRC). The modeling approach taken for TSPA-LA may differ from that taken for TSPA-SR. This approach may involve component model simplification and the use of conservative/bounding assumptions, where appropriate.

This milestone will summarize TSPA modeling approach that will be used in TSPA-LA. It will demonstrate how the safety case strategy will be implemented into TSPA modeling. It will identify the conceptual model and parameter distributions expected to be used. It will include a discussion of the approach to be taken (both at the total system level and the model sub-component level), the major assumptions that will be made, a description of the software that will be used and tested, a discussion as to what features, events, and processes (FEPs) will be evaluated, as well as the rationale for not addressing certain FEPs or the effects of certain FEPs. It will address the primary issues to be evaluated in sensitivity studies and serve as the draft introduction to the TSPA-LA document.

Acceptance Method:

This milestone will be completed following the AP-7.5Q review of the supporting Level 3 Milestone and resolution of all comments.

Key Predecessor Milestones:

M2NW – TSPA-SR Rev. 01

Key Successor Milestones:

M2NY - TSPA-LA

Supporting Level 3 Milestones:

TBD - “TSPA-LA Methods and Assumptions Document”

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M2HX
PSS Title: Complete Drift Scale Heater Test Heat Up

WBS Number: 1.2.22.4.N **DECISION DOCUMENTATION REQUIRED - YES__X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 01/09/02
Milestone Level: M2

Milestone Description:

This milestone will be complete when the heat up phase ends and the cooling phase start is authorized.

Acceptance Method:

DOE will send a letter to M&O authorizing the start of the cooling phase of the Drift Scale Test, and notify the DOE/YMSCO Project Control Director of the authorization.

Key Predecessor Milestones:

SP3334M3 – Complete Drift-Scale Heat Up, 12/10/01

Key Successor Milestones:

SP3160M3 – Drift Scale Test Heating Phase Summary Report, 09/16/02

Supporting Level 3 Milestones: SP3329M3

Near-Field Models Report Update during performance confirmation test period
Near-Field Environment Report Vol. I (Design parameters) & II (NFE database) update during performance confirmation test period
EMCR Update

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2MW
PSS Title: Final License Application and Design Verification (Final LA Design & Verification)

WBS Number: 1.2.22.3.5 **DECISION DOCUMENTATION REQUIRED - YES___NO_X__**
Product: License Application
Subproduct: Repository and Waste Package Design
Scheduled Date: 01/09/02
Milestone Level: M2

Milestone Description:

This milestone is the completion of the OCRWM AP 7.5Q review of the M&O letter report, confirming that all mandatory DOE comments from the DOE design verification review have been adequately resolved consistent with AP 7.5Q. The letter report will include a demonstration that the resolutions agreed to have been implemented or action plans developed.

This milestone verifies that the LA design meets applicable criteria, is internally consistent, and consistent with the EIS. The focus of the verification will be a review of the referenced DOE Requirements Documents, System Design Description Documents, and supporting design analyses and products on the LA Products List that provide the design basis for the LA design. This includes all safety related analyses of the surface designs and the safety and waste isolation analyses for the EBS.

Acceptance Method:

This milestone shall be considered complete upon successful completion of a DOE review and acceptance of the letter report.

Key Predecessor Milestones:

M2MX – SR Design and Options Final Confirmation Decision
M2NT – OCRWM Accepts SR Design & Waste Form Report for Review

Key Successor Milestones:

M2ND – YMSCO Initiates DOE/Navy Review of Draft License Application

Supporting Level 3 Milestones:

SEA25CM3 – Complete DOE Verification of LA Design

Change Request Date:
Change Request Number:

Functional Manager:_____ **Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2MY
PSS Title: Verify Fabrication, Procurement, and Construction Design Requirements (Verify Fab., Procure., & Const. Design Requirements)

WBS Number: 1.2.30 **DECISION DOCUMENTATION REQUIRED - YES_X__NO___**
Product: Monitored Geologic Repository
Subproduct: N/A
Scheduled Date: 09/30/02
Milestone Level: M2

Milestone Description:

This milestone is a letter report to DOE documenting the completion of the verification of the design requirements for Fabrication, procurement, and Construction design. The verification focuses on those requirements not previously verified. The verification may result in a change as necessary to the CPA or requirements document and identification of additional items required for the verification.

Acceptance Method:

This milestone shall be considered complete upon successful completion of the management presentation of the Fabrication, Procurement, & Construction Design Criteria Bases, along with resolution for or agreed-to implementation plans for resolution of any mandatory comments.

Key Predecessor Milestones:

M2MV – Proposed Design for Chapters SR/LA Requirements Basis Established for Fabrication, Procurement, & Construction Design (L3)

Note: Revision of requirements documents to support requirements basis established for Fabrication, Procurement, & Construction Design (L3) – Including: CPA, MGR-RD, & SDD updates to reflect update design bases for selected reference design.

Key Successor Milestones:

M2ME – Complete Fab., Procurement and Const.Design

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2NC
PSS Title: DOE/Navy Complete Review of Draft License Application
(OCRWM, other DOE offices, & the Navy complete Rev of Dft LA)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED - YES__X_NO___**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 09/13/02
Milestone Level: M2

Milestone Description:

The Draft LA will be consistent with the Technical Guidance Document and any applicable DOE guidance. The review will include interactive comment resolution; a revised document; verification of comment resolution; and consistency check. The milestone will be complete when the review comments have been resolved and a revised Draft LA has been prepared and accepted by the reviewers.

Acceptance Method:

Complete the review of the Draft LA by DOE/Navy.

Key Predecessor Milestones:

M2ND – YMSCO Initiates DOE/Navy Review of Draft LA

Key Successor Milestones:

M1KX –OCRWM Submits Draft LA to DOE Offices for Concurrence

Supporting Level 3 Milestones:

None

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2ND
PSS Title: YMSCO Initiates DOE/Navy Review of Draft License Application (YMSCO Initiates DOE/Navy Review of Draft LA)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED - YES___NO__X_**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 08/13/02
Milestone Level: M2

Milestone Description:

Submit the Draft LA to OCRWM, other DOE offices (GC, CP, EM, etc.), and the Navy for review. The Draft LA will be prepared to be consistent with the then current revision of the guidance for the LA contained in the Technical Guidance Document for the Preparation of the LA and any additional guidance, as appropriate. The Draft LA will incorporate all the delta packages and reflect resolution of comments received during the integrated review team review of the document.

Acceptance Method:

The milestone will be complete when the review of the draft LA by OCRWM, other DOE offices, and the Navy has been initiated.

Key Predecessor Milestones:

M2MW – Final LA Design and Verification

Key Successor Milestones:

M2NC – DOE/Navy Complete Review of Draft License Application

Supporting Level 3 Milestones:

TBD – Submit Draft LA to YMSCO for OCRWM, other DOE offices, and Navy review

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Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2NY
PSS Title: Total System Performance Assessment – License Application (TSPA-LA)

WBS Number: 1.2.22.4.2 **DECISION DOCUMENTATION REQUIRED - YES__X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 07/15/02
Milestone Level: M2

Milestone Description:

TSPA-LA will be used to support the License Application. TSPA-LA will provide a reasonable estimate of the long-term behavior of the total repository system. TSPA-LA will include models for all potentially significant features, events, and processes that may affect the ability of the site and EBS to contain/isolate radioactive waste. These models will represent the understanding of these features, events and processes and will explicitly address the level of uncertainty in this understanding. Where appropriate and warranted, these models will be conservative. The total repository system that will be analyzed includes all aspects of the LA design (waste package, engineered barrier segment and repository), the site conditions that potentially impact the containment and isolation of radionuclides from the biosphere, and the biosphere itself.

TSPA-LA will update TSPA-SR Rev. 01. Abstracted models used in TSPA-SR Rev. 00 and TSPA-SR Rev. 01 may be refined based on new information and review of the TSPA-SR documents. Additional analyses will be performed to support the 10 CFR Part 63 compliance evaluation. Sensitivity analyses will be conducted, above those conducted in TSPA-SR Rev. 01. These sensitivity analyses will fully address the NRC Key Technical Issues (NRC Issue Resolution Status Report acceptance criteria), defense-in-depth, and subsystem performance.

A stand-alone document will be produced. It will include all documentation needed to support the 10 CFR 63 compliance evaluation and the License Application. It will be based on the structure proposed in the TSPA- LA Methodology and Assumptions Document. The document will be reviewed by all affected M&O organizations prior to completion of the Milestone.

Briefings addressing the progress/status of activities leading to the successful, on-time completion of this milestone will be conducted. Briefings will be to applicable YMSCO personnel by key M&O Performance Assessment managers, and will be supported with material suitable for YMSCO videoconference interactions with OCRWM semi-annual briefings addressing the progress/status of activities leading to the successful, on-time completion of the milestone will be conducted.

Acceptance Method:

This milestone will be completed following the AP-7.5Q review of the supporting Level 3 Milestone and resolution of all comments.

Key Predecessor Milestones:

M2NW- TSPA-SR Rev. 01
M2__ - TSPA-LA Methods and Assumptions Document

M2SL - Near Field Environment PMR, Rev.
M2SN **-** Waste Package Degradation PMR, Rev.
M2SP - Saturated Zone Flow and Transport PMR, Rev.
M2SR - Integrated Site Model PMR, Rev.
M2SS - Engineered Barrier System Degradation PMR, Rev.
M2ST - Biosphere PMR, Rev.
M2SU **-** Unsaturated Zone Flow and Transport PMR, Rev.
M2SV - Waste Form Degradation PMR, Rev.
M2SW **-** Disruptive Events PMR, Rev.

Key Successor Milestones:

M2ND – YMSCO Initiates DOE/Navy Review of Draft License Application

Supporting Level 3 Milestones:

SL980M3 - TSPA-LA Final

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M2YP
PSS Title: Yucca Mountain Project Plan, Annual Update
(YMP Plan, Annual Update)

WBS Number: 1.2.22.6.4 **DECISION DOCUMENTATION REQUIRED - YES___NO__X_**
Product: License Application
Subproduct: Technical and Regulatory Implementation
Scheduled Date: 09/30/02
Milestone Level: M2

Milestone Description:

Description/Content: The YMP employs a multi-year planning process to define the work scopes, deliverables, schedules, and estimated costs for all remaining work required to meet the Project and Program objectives. The YMP Plan is updated annually prior to the start of a new fiscal year using the "rolling wave" approach in which the near-term work is planned in detail in Work Packages and the far-term work is captured in less detail in Planning Packages. Planning data from the Work Packages and Planning Packages are summarized into Control Accounts. The annual update to the YMP Plan includes three levels of planning documentation: (1) detailed planning documentation; (2) summaries of the detailed plans; and (3) changes to the Project Summary Schedule (PSS) that reflect the roll-ups of the detailed plans.

The detailed planning documentation includes: (a) Control Account documentation contains a summary statement of work covering the duration of the account; time-phased budget by fiscal year; a list of subordinate Work Packages and Planning Packages; a list of all deliverables; and descriptions, completion criteria, acceptance Method, and completion dates for Work Package deliverables; (b) Work Package documentation by Affected Organization that includes the statement of work; a list of technical assumptions and requirements; cost estimate and estimating rationale; time-phased budget by fiscal year; and a list of all deliverables, including descriptions, completion criteria, acceptance Method, and completion dates; (c) Planning Package documentation that includes a general statement of work; an initial list of technical assumptions and requirements; cost estimate and estimating rationale; time-phased budget by fiscal year; an initial list of deliverables, including titles, preliminary descriptions, and forecasted completion dates; and (d) bar chart schedules of Work Package and Planning Package activities taken from the Integrated Project Schedule.

Additional summaries of the planning documentation include: (a) multi-year cost summaries by third level of the WBS; (b) cost summaries by Affected Organization for the execution fiscal year; (c) list of all YMP Level 0, 1, 2 and 3 milestones and completion dates; and (d) the Integrated Project Schedule.

Changes to the PSS may be required to ensure consistency with the detailed planning documentation. If necessary, changes to the PSS may include: (a) new or revised PSS activity descriptions; (b) new or revised PSS milestone/deliverable descriptions, completion criteria, acceptance Method, or completion dates; (c) new or revised logic relationships for the PSS activities; and (d) schedule bar charts showing the revised PSS activities.

Planning must have adequate level of detail to support the OMB 5-year budget cycle with Statements of Work at Work Breakdown Structure third level and this calendar year.

Acceptance Method:

The plan is accepted upon signing of the baseline Change Request.

Key Predecessor Milestones:

M2KM - YMP Plan Annual Update

Key Successor Milestones:

Supporting Level 3 Milestones:

Submit Final YMP Plan Update to YMSCO
Submit Change Request to YMSCO to baseline YMP Plan Update

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M0AM
PSS Title: DOE Submits License Application to Nuclear Regulatory Commission (DOE Submits LA to NRC)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED - YES___NO__X_**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 01/28/03
Milestone Level: M0

Milestone Description:

This Level 0 milestone will be complete when DOE provides 3 complete copies to the NRC Director of Nuclear Material Safety and Safeguards. DOE will retain 120 copies for distribution at the direction of the NRC Director, and will provide public access local to the proposed repository. This milestone will be complete when the required number of copies of the License Application and EIS have been delivered to the NRC as required by 10 CFR 60.22 (or 10 CFR 63.22 as appropriate) and NWPA.

Acceptance Method:

Return receipt verification of delivery of LA and EIS copies.

Key Predecessor Milestones:

M0AW – DOE Signs the LA

Key Successor Milestones:

TBD

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M0AW
PSS Title: DOE Signs the License Application
(DOE Signs the LA)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED - YES___NO __**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 01/14/03
Milestone Level: M0

Milestone Description:

The LA is accepted and signed by the Department of Energy for transmittal to the NRC. Copies may have already been made.

Acceptance Method:

This milestone is complete when the DOE signs the LA.

Key Predecessor Milestones:

M1BC – RW-1 Submits the LA to S-1

Key Successor Milestones:

M0AM – DOE Submits License Application to NRC

Supporting Level 3 Milestones:

None

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1BC
PSS Title: RW-1 Submits the License Application to S-1
(RW-1 Submits the LA to S-1)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED - YES___NO_X__**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 01/07/03
Milestone Level: M1

Milestone Description:

This milestone will be completed when RW-1 submits the LA to the Secretary for acceptance and submittal to NRC.

Acceptance Method:

RW-1 submits the completed LA, with the documentation of concurrence by OCRWM and all relevant DOE offices under formal Secretarial decision memo.

Key Predecessor Milestones:

M1NB – Complete RW-1 Acceptance of LA
M2NS – YMSCO Completes Documentary Record for LA

Key Successor Milestones:

M0AW – DOE Signs the LA

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1KX
PSS Title: OCRWM Submits Draft License Application to DOE Offices for Concurrence (OCRWM Submits Draft LA to DOE Offices for Concur)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED - YES___NO__X_**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 12/10/02
Milestone Level: M1

Milestone Description:

Following OCRWM Project and Office Managers' concurrence OCRWM will submit the Draft LA to the appropriate DOE Offices and the Navy for concurrence (EM, EH, MD, GC, etc.).

Acceptance Method:

This milestone will be complete when the Draft LA has been provided to the appropriate DOE offices and the Navy for their concurrence.

Key Predecessor Milestones:

M2NC – DOE/Navy Complete Review of Draft License Application

Key Successor Milestones:

M1NR – Complete DOE and Navy Concurrence of Draft LA

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1NB
PSS Title: Complete RW-1 Acceptance of License Application
(Complete RW-1 Acceptance of LA)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED - YES___NO __**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 01/03/03
Milestone Level: M1

Milestone Description:

This milestone is complete when the final LA is accepted by RW-1and is ready for submittal to the Secretary. A master copy will be sent to the "printer" in preparation for submittal to the NRC.

Acceptance Method:

This milestone is complete when RW-1 signs the LA and a master copy is delivered for printing.

Key Predecessor Milestones:

M2NA – YMSCO Submits LA to RW-1 for Acceptance

Key Successor Milestones:

M1BC – RW-1 Submits the LA to S-1

Supporting Level 3 Milestones:

None

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M1NR
PSS Title: Complete DOE and Navy Concurrence of Draft License Application (Complete DOE and Navy Concurrence of Draft LA)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED - YES_X__NO___**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 12/24/02
Milestone Level: M1

Milestone Description:

Resolve comments by DOE offices and the Navy on Draft LA and obtain their concurrence.

Acceptance Method:

This milestone will be complete when all concurrence comments by appropriate DOE offices and the Navy have been resolved and their concurrence on the draft LA has been documented.

Key Predecessor Milestones:

M1KX – OCRWM Submits Draft LA to DOE Offices for Concurrence

Key Successor Milestones:

M2NA – YMSCO Submits LA to RW-1 for Acceptance

Supporting Level 3 Milestones:

N/A

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2JF
PSS Title: Accept Drift Scale Test Heating Phase Summary Report
(Accept Drift Scale Test Heating Phase Sum. Rpt.)

WBS Number: 1.2.22.4.N **DECISION DOCUMENTATION REQUIRED - YES_X_NO___**
Product: License Application
Subproduct: Preclosure and Postclosure Performance
Scheduled Date: 10/17/02
Milestone Level: M2

Milestone Description:

The NFE PMR for LA will be a revision of the PMR prepared for the SR. The content of the PMR is not expected to be significantly different in scope. The NFE PMR for LA will incorporate the data, associated analyses/interpretations, and model updates that became available from the on-going thermal tests since the SR data-cut off date. These ongoing thermal tests were identified in the PMR for SR and are listed below. In addition, the NFE PMR for LA will incorporate the data, associated analyses/interpretations, and model updates that result from new thermal tests started since the SR cutoff date. These thermal tests are also identified below.

The NFE PMR is a synthesis of both the in-situ thermal testing and the coupled process models/analyses that provides an integrated overview of the thermally-driven, coupled processes in the geosphere that affect the thermal-hydrological-chemical-mechanical environment of the drifts. The PMR will reference AMRs prepared under other process model development activities. This NFE PMR will contain sufficient detail to enable a reader to find a clear explanation of performance of those components commonly associated with the NFE, especially as done in the NRC's Issue Resolution Status Report on the NFE. The PMR will reference other PMRs for detailed discussions of the near-field processes. An important function of this NFE PMR will be to demonstrate integration of the various near-field processes and serve as the focal point for transparency and traceability in the evaluations of near-field processes.

The list of AMRs that are currently in the schedule as directly supporting the NFE PMR will remain as is and will be addressed in the PMR. The NFE PMR will refer to other PMRs, as appropriate, for detailed discussions of other NFE processes and models. All AMRs referenced in the PMR must be complete and available at the time of PMR submittal to DOE for formal review.

The PMR development activity will integrate available thermal test data and the relevant conceptual and numerical model developments incorporating the site-specific characteristics under the thermal effects. The source of the available data will include specifically those listed below.

The PMR will be developed in accordance with the QARD and using approved QA procedures for analysis and modeling such that the conclusions in the PMR and the sub-models can be followed back through completely to the supporting data. Traceability to particular data and parameter sets (in the database) on which model revisions are based, need to be provided to the general user.

Testing that supports this PMR may continue beyond completion of the PMR as part of the Performance Confirmation Program. Development and maintenance of the Performance

Confirmation Program Plan is covered under WBS 1.2.22.5.2. Performance Confirmation Testing and Assessment, WBS 1.2.22.4.7, will cover any testing that is conducted as part of the performance confirmation program. A final review of the field experimentation program results should be performed at as late as possible a date to assure that the most current field and experimental results do not contradict the conceptual models and assumptions of the NFE PMR.

Acceptance Method:

This Level 2 milestone will be completed when DOE accepts the Drift-Scale Heating Phase Summary Report, and notifies the DOE Project Manager of such acceptance.

Key Predecessor Milestones:

SP3160M3 – Drift Scale Heating Phase Summary Report, 09/16/02

Key Successor Milestones:

SP2230M3 – Drift Scale Test Progress Report #6, 08/26/03

Supporting Level 3 Milestones:

Near-Field Models Report Update During Performance Confirmation Test Period
Near-Field Environment Report Vol. I (Design parameters) & (NFE Database) update during Performance Confirmation Test Period
EMCR Update

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2NA
PSS Title: YMSCO Submits License Application to RW-1 for Acceptance
(YMSCO Submits LA to RW-1 for Acceptance)

WBS Number: 1.2.22.8 **DECISION DOCUMENTATION REQUIRED- YES__NO__X_**
Product: License Application
Subproduct: Integrated License Application
Scheduled Date: 01/03/03
Milestone Level: M2

Milestone Description:

The LA is sent to RW-1 with required DOE concurrence for acceptance as complete and ready for transmittal to the Secretary.

Acceptance Method:

This milestone is complete when the final LA is submitted to RW-1 with required DOE concurrence for acceptance as complete and ready for submittal to the Secretary

Key Predecessor Milestones:

M1NR – Complete DOE and Navy Concurrence of Draft LA

Key Successor Milestones:

M1NB – Complete RW-1 Acceptance of LA

Supporting Level 3 Milestones:

None

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M2NS
PSS Title: YMSCO Completes Documentary Record for License Application (YMSCO Completes Documentary Record for LA)

WBS Number: 1.2.22.6.3 **DECISION DOCUMENTATION REQUIRED - YES___NO__X_**
Product: License Application
Subproduct: Technical and Regulatory Implementation
Scheduled Date: 01/03/03
Milestone Level: M2

Milestone Description:

This milestone will be met when the Documentary Record supporting the License Application is completed and accepted by YMSCO. The Documentary Record for this activity will be completed by compilation of the documentation supporting License Application. For the License Application, a compilation will be made of all information that was directly considered in its development, the assumptions that were made, and a rationale for why the considered information was or was not used. Traceability to the records system, technical data management system, and 3-D model warehouse will be maintained by referencing the appropriate product or accession number.

Acceptance Method:

The milestone is complete when the supporting Level 3 milestone has been approved by YMSCO under AP-6.28Q and all comments have been resolved. The Product Manager will notify the Project Manager by letter verifying requirements have been met.

Key Predecessor Milestones:

M2JV – DOE Certificate of Compliance with 10CFR Part 2, Subpart J

Key Successor Milestones:

M1BC - RW-1 Submits the LA to the S-1

Supporting Level 3 Milestones:

SLLAARM3 – LA Documentary Record

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M2ME
PSS Title: Complete Fabrication, Procurement and Construction Design (Complete Fab., Procurement and Const.Design)

WBS Number: 1.2.1 **DECISION DOCUMENTATION REQUIRED - YES__X_NO___**
Product: Construction Authorization
Subproduct: Construction Authorization
Scheduled Date: 03/01/05
Milestone Level: M2

Milestone Description:

This milestone completes the design product, which defines the engineering design for use in repository construction in accordance with the DOE accepted management plan (a Procurement and Construction Design and Review Plan). The design product will consist of a text based design description in the form of an update of the Reference Design Description (RDD) identified as the Procurement and Construction Design Description. In addition, the design product will consist of a set of drawings, analyses, calculations, and specifications. A detailed list of all these drawings, analyses, calculations, and specifications will be provided in a Procurement and Construction Design and Review Plan.

Acceptance Method:

This milestone shall be considered complete when the design product has been found to satisfy the description above and upon completion of a YMSCO acceptance review, including resolution of any comments.

Key Predecessor Milestones:

Complete LA Design Products

Key Successor Milestones:

To be developed by the M&O during the planning process for the FY1999 AWP

Supporting Level 3 Milestones:

To be developed by the M&O during the planning process for the FY1999 AWP

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information
Modified 4/04/00

PSS ID No: M2MG
PSS Title: Complete Drift Scale Test

WBS Number: 1.2.30.6 **DECISION DOCUMENTATION REQUIRED - YES__X_NO___**
Product: Monitored Geologic Repository
Subproduct: Performance Confirmation and Research and Development Testing
Scheduled Date: 12/16/05
Milestone Level: M2

Milestone Description:

The drift scale heater test is a long-term test to obtain data on the mechanical and thermohydrologic properties of a repository host rock. The test is designed to simulate the heat from waste packages emplaced in an underground repository. The total duration of this test will be approximately eight years: four to heat-up and four to cool down.

Acceptance Method:

This milestone will be met when DOE issues a letter stating that the objectives/Method of the DST have been met, and the test is ready to be completed and notify the DOE Project Manager of such acceptance.

Key Predecessor Milestones:

SPY3333M3

Key Successor Milestones:

M2MM – Complete Drift Scale Test Summary Report

Supporting Level 3 Milestones:

SP2270M3 – Drift Scale Test Summary Report

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M2MM
PSS Title: Complete Drift Scale Test Summary Report

WBS Number: 1.2.30.6 **DECISION DOCUMENTATION REQUIRED - YES___NO_X_**
Product: Monitored Geologic Repository
Subproduct: Performance Confirmation and Research and Development Testing
Scheduled Date: 09/29/06
Milestone Level: M2

Milestone Description:

The drift scale heater test is a long-term test to obtain data on the mechanical and thermohydrologic properties of a repository host rock. The test is designed to simulate the heat from waste packages emplaced in an underground repository. The total duration of this test will be approximately eight years: four to heat-up and four to cool down.

Acceptance Method:

This Level 2 milestone will be completed when DOE accepts the Drift-Scale Test Summary Report, and notifies the DOE Project Manager of such acceptance.

Key Predecessor Milestones:

SP2270M3 – Drift Scale Test Summary Report

Key Successor Milestones:

None

Supporting Level 3 Milestones: Milestone # TBD

Supports Performance Confirmation Milestones for UZ Radionuclide Transport, Design and TSPA

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

Yucca Mountain Project Summary Schedule
Milestone Description and Supporting Information

PSS ID No: M2RF
PSS Title: Construction Authorization

WBS Number: **DECISION DOCUMENTATION REQUIRED - YES___NO_X_**
Product: Construction Authorization
Subproduct: Construction Authorization
Scheduled Date: 03/10/05
Milestone Level: M2

Milestone Description:

The Nuclear Regulatory Commission (NRC) approves the issuance of a Construction Authorization to the Department of Energy (DOE) for all or part of a repository after consideration of an application. Consideration of the application shall be in accordance with laws applicable to such an application.

Acceptance Method:

Receipt of the Construction Authorization from the NRC

Key Predecessor Milestones:

M0AM - DOE Submits License Application to the NRC

Key Successor Milestones:

M2XX - Authorization to Receive Spent Nuclear Fuel and Defense High Level Waste

Supporting Level 3 Milestones:

Change Request Date:
Change Request Number:

Functional Manager:_____**Date:**_____

ENCLOSURE 4

Yucca Mountain

WBS Dictionary

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.20

TITLE: Environmental Impact Statement

OBJECTIVE: Support the Office of Civilian Radioactive Waste Management in developing an Environmental Impact Statement and related documentation for the Yucca Mountain Site Characterization Project, as required by the Nuclear Waste Policy Act of 1982, as amended.

DESCRIPTION OF WORK: All efforts required to:

- Develop, prepare, and issue the draft Environmental Impact Statement and final Environmental Impact Statement documents to ensure that the activities mandated by the Nuclear Waste Policy Act of 1982, as amended, are conducted in compliance with the requirements of the National Environmental Policy Act of 1969, Council on Environmental Quality regulations, and Department of Energy National Environmental Policy Act of 1969 implementation

- Complete an Administrative Record, Mitigation Action Plan, Annual reports on implementation of the Mitigation Action Plan, Semiannual Environmental Assessment Reports, and any activities associated with the creation of a decision document related to the Environmental Impact Statement regulations

- Complete all activities necessary and sufficient for consultations and coordinations required by Council on Environmental Quality regulations, including those with Native American Tribes

- Support development of the Site Recommendation Consideration Report and the Site Recommendation

- Comply with 10 CFR 1021 and 40 CFR 1500, et seq.

- Document completion of the Environmental Impact Statement activities, and ensure that the Environmental Impact Statement Administrative Record is complete

- Support Nuclear Regulatory Commission adoption of the final Environmental Impact Statement

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.20.1

TITLE: Final Environmental Impact Statement (FEIS)

OBJECTIVE: Support the Office of Civilian Radioactive Waste Management in developing an Environmental Impact Statement and related documentation for the Yucca Mountain Site Characterization Project, as required by the Nuclear Waste Policy Act of 1982 , as amended.

DESCRIPTION OF WORK: All efforts required for the Environmental Impact Statement Contractor and Management and Operating Contractor to:

- Assist in the development and issue the draft Environmental Impact Statement and final Environmental Impact Statement documents to ensure that the activities mandated by the Nuclear Waste Policy Act of 1982 , as amended, are conducted in compliance with the requirements of the National Environmental Policy Act of 1969, Council on Environmental Quality regulations, and Department of Energy National Environmental Policy Act of 1969 implementation. This includes:

    - Complete an Administrative Record
    - Assist in conducting related public hearings
    - Assist in Environmental Impact Statement comment resolution and preparation of responses to public comments
    - Integrate technical input to the Environmental Impact Statement (engineering, environment, Total System Performance Assessment, general support)
    - Support reviews
    - Print and distribute the final Environmental Impact Statement issuance and publish the Notice of Availability of the final Environmental Impact Statement

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.20.1.1

TITLE: Develop Final Environmental Impact Statement (Develop FEIS)

OBJECTIVE: Support the Office of Civilian Radioactive Waste Management in developing an Environmental Impact Statement and related documentation for the Yucca Mountain Site Characterization Project, as required by the Nuclear Waste Policy Act of 1982, as amended.

DESCRIPTION OF WORK: All efforts required for the Environmental Impact Statement Contractor to:

- Maintain a Project Management Plan to support the development of an Environmental Impact Statement. The Project Management Plan includes a comprehensive listing of project objectives, management systems and controls, and technical systems and controls

- Develop, prepare, and issue the draft Environmental Impact Statement and final Environmental Impact Statement documents to ensure that the activities mandated by the Nuclear Waste Policy Act of 1982, as amended, as amended, are conducted in compliance with the requirements of the National Environmental Policy Act of 1969, Council on Environmental Quality regulations, and Department of Energy National Environmental Policy Act of 1969 implementation, including:

  - Review project and nonproject information that may contain environmental impacts pertaining to the activities at Yucca Mountain
  - Provide documentation of the Environmental Impact Statement contractor activities as input to an Administrative Record for the final Environmental Impact Statement

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.20.1.2

TITLE: Support Final Environmental Impact Statement Development (Support FEIS Development)

OBJECTIVE: Support the Office of Civilian Radioactive Waste Management in developing an Environmental Impact Statement and related documentation for the Yucca Mountain Site Characterization Project, as required by the Nuclear Waste Policy Act of 1982, as amended.

DESCRIPTION OF WORK: All efforts required for the Management and Operating Contractor to:

- Complete all activities necessary and sufficient for consultations and coordinations required by the Council on Environmental Quality regulations
- Support the requirements of the American Indian Religious Freedom Act and programmatic agreement with respect to consultation and interactions with 17 official tribes and tribal organizations
- Support archaeological resource activities and conduct Yucca Mountain Site Characterization Project site and archaeological laboratory visits for cultural resource monitoring, Native American Graves Protection and Repatriation Act consultations, and educational purposes
- Complete all activities necessary and sufficient to fully develop and implement a transportation program within the state of Nevada
- Develop, integrate and implement transportation policies with the state of Nevada
- Complete all activities required to create the Administrative Record for the repository Environmental Impact Statement
- Provide publication services for the final Environmental Impact Statement
- Provide overall Nuclear Waste Policy Act of 1982, as amended, technical and procedural expertise and assistance in comment resolution
- Facilitate coordination with other areas providing technical input to the Environmental Impact Statement (e.g., engineering, environmental, transportation, total system performance assessment, general support)

WBS: 1.2.20.1.2 (Continued)

- Support programmatic reviews of the preliminary final Environmental Impact Statement materials

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.20.2

TITLE: Post-Final Environment Impact Statement Issuance Activities (Post-FEIS Issuance Activities)

OBJECTIVE: Support all work activities planned to support completion of the draft and final Environmental Impact Statement Administrative Records, issuance of the Mitigation Action Plan, and development of materials needed to support a decision document.

DESCRIPTION OF WORK: All efforts required for the Environmental Impact Statement Contractor and Management and Operating Contractor to:

- Complete a Mitigation Action Plan and any activities associated with the creation of a decision document related to the Environmental Impact Statement regulations
- Support development of the Site Recommendation
- Complete semiannual National Environmental Policy Act of 1969 compliance assessments
- Prepare annual reports on implementation of the Mitigation Action Plan
- Identify and track all mitigation commitments
- Comply with 10 CFR 1021 and 40 CFR 1500, et seq.
- Document completion of the Environmental Impact Statement activities and complete that the Environmental Impact Statement Administrative Record
- Support Nuclear Regulatory Commission adoption of the final Environmental Impact Statement

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.20.2.1

TITLE: Post-Final Environment Impact Statement Activities (Post-FEIS Activities)

OBJECTIVE: Support all work activities planned to support completion of the draft and final Environmental Impact Statement Administrative Records, issuance of the Mitigation Action Plan, and development of materials needed to support a decision document.

DESCRIPTION OF WORK: All efforts required for the Environmental Impact Statement Contractor to:

- Prepare a draft Mitigation Action Plan for Department of Energy review
- Assist in the preparation of any activities associated with the creation of a decision document related to the Environmental Impact Statement regulations, if requested by Department of Energy
- Close out and deliver all applicable records to the Administrative Records Administrator
- Work with the Administrative Records Administrator to close gaps during and following the Administrative Records reviews
- Document completion of the Environmental Impact Statement

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.20.2.2

TITLE: Support Post-Final Environment Impact Statement Activities (Support Post-FEIS Activities)

OBJECTIVE: Support all work activities planned to support completion of the draft and final Environmental Impact Statement Administrative Records, issuance of the Mitigation Action Plan, and development of materials needed to support a decision document.

DESCRIPTION OF WORK: All efforts required for the Management and Operating Contractor to:

- Assist in the preparation, review, and documentation of the Mitigation Action Plan
- Assist in the preparation of any activities associated with the creation of a decision document related to the Environmental Impact Statement regulations, if requested by the Department of Energy
- Support development and review of the Site Recommendation
- Complete semiannual National Environmental Policy Act of 1969 compliance assessments
- Prepare annual reports on implementation of the Mitigation Action Plan
- Identify and track all mitigation commitments
- Comply with 10 CFR 1021 and 40 CFR 1500, et seq.
- Document completion of the Environmental Impact Statement activities and complete the Environmental Impact Statement Administrative Record
- Support Nuclear Regulatory Commission adoption of the final the Environmental Impact Statement

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21

TITLE: Site Recommendation

OBJECTIVE: Produce and provide a basis for a Secretarial decision on whether to recommend approval by the President of the Yucca Mountain site for development of a repository.

DESCRIPTION OF WORK: All efforts required to:

- Complete all technical work necessary to complete site characterization and evaluate the suitability of the site
- Complete all design work necessary to support the Site Recommendation
- Provide all support and processes necessary to complete site characterization and repository design for Site Recommendation
- Provide all business, logistics, computer, project management, and institutional support necessary to support Site Recommendation
- Plan and implement a process in accordance with the requirements of the Nuclear Waste Policy Act of 1982, Section 114, including public consideration hearings, to support a recommendation decision by the Secretary of Energy
- Maintain the resources and services necessary to continue all essential Yucca Mountain Site Characterization Project activities, including site facilities and services; information management; testing and monitoring; technical, management, and operational support; and business processes

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.1

TITLE: Basis for Recommendation

OBJECTIVE: Complete a Basis for Recommendation that summarizes the essential information that will form the basis for the Secretary of Energy's decision on whether to recommend approval of the site to the President.

DESCRIPTION OF WORK: All efforts required to:

- Develop and produce an overview for the Site Recommendation Consideration Report and, if appropriate, an overview for the Site Recommendation
- Develop and produce a Basis for Recommendation document to summarize the essential information that will form the basis for the Secretary of Energy's decision on whether to recommend approval of the site to the President
- Participate in strategic planning discussions and review and prepare white papers on Site Recommendation issues

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.2

TITLE: Yucca Mountain Site Characterization and Repository Design (YM Site Characterization & Repository Design)

OBJECTIVE: Produce and provide Volume 1, Yucca Mountain Site Characterization and Repository Design, of the Site Recommendation Consideration Report.

DESCRIPTION OF WORK: All efforts required to:

- Complete site characterization and engineering and design work necessary to complete and develop Volume 1 of the Site Recommendation Consideration Report and, if appropriate, the Site Recommendation
- Develop, maintain, and revise the Yucca Mountain Site Description document
- Develop and produce documents and other work products related to the surface design description
- Develop and produce documents and other work products related to the subsurface design description
- Develop and produce documents and other work products related to the waste package design description
- Develop and produce documents and other work products related to systems engineering
- Provide technical support to the work elements above, as appropriate

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.2.1

TITLE: Site Recommendation Report, Volume 1, Yucca Mountain Site Characterization and Repository Design (SR Vol 1—YM Site Char & Repos Design)

OBJECTIVE: Prepare and compile input to and production of Volume 1, Yucca Mountain Site Characterization and Repository Design, of the Site Recommendation Consideration Report, which includes four chapters and an overview, and (if appropriate) the Site Recommendation .

DESCRIPTION OF WORK: All efforts required to:

- Provide the documentation required by the Nuclear Waste Policy Act of 1982 (NWPA), Sections 114(a)(1)(A) through 114(a)(1)(C), for a comprehensive statement of the basis for the Secretary of Energy's decision on whether to recommend approval of the site to the President, including:
  - A description of the proposed repository, including preliminary engineering specifications for the facility [NWPA 114(a)(1)(A)]
  - A description of the waste form or packaging proposed for use at the repository and an explanation of the relationship between the waste form or packaging and the geologic medium of the site [NWPA 114(a)(1)(B)]
  - A discussion of the data obtained in site characterization activities relating to the safety of the site [NWPA 114(a)(1)(C)]
- Provide documentation explaining the purpose and scope of the Site Recommendation Consideration Report and, if appropriate, the Site Recommendation

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.2.2

TITLE: Site Characterization Description for Site Recommendation (Site Characterization Description for SR)

OBJECTIVE: Develop the Yucca Mountain Site Description, and provide input to Volume 1 of the Site Recommendation.

DESCRIPTION OF WORK: All efforts required to:

- Maintain the Yucca Mountain Site Description, which will provide an integrated discussion of what has been learned about the natural system at Yucca Mountain and serve as a technical basis for preparing the site description portion of the Site Recommendation

- Include in the Yucca Mountain Site Description, information on the geography and demography of the site; nearby industrial, transportation, and military facilities; geology, hydrology, climatology, meteorology, geochemistry, and near-field effects; and natural analogues

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.2.3

TITLE: Surface Design Description

OBJECTIVE: Produce a surface design description, and provide it as input to Volume 1 of the Site Recommendation.

DESCRIPTION OF WORK: All efforts required to:

- Prepare descriptions of the Surface Facilities, which will vary in level of detail in accordance with the importance and safety classification of the systems. Descriptions include the Waste Handling Building foundation and structure, which will require a greater level of detail, and other Surface Facility systems which will be described with information provided by Sections I or II of the System Description Documents, depending on the importance of the systems

- Provide design support for the Safety Analyses and for the Design Basis Event Analyses for Surface Facilities. The level of design detail for each system, structure and component and supporting documentation is commensurate with the safety significance of the system, structure and component, as determined by the safety analysis

- Provide support for addressing comments from the Nuclear Regulatory Commission, State of Nevada, and other organizations affected by the Site Recommendation

- Provide support for writing and reviewing Site Recommendation related documentation

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.2.4

TITLE: Subsurface Design Description

OBJECTIVE: Complete design and testing activities to produce a subsurface design description, and provide it as input to the Site Recommendation.

DESCRIPTION OF WORK: All efforts required to:

- Prepare descriptions of the subsurface facilities, which will vary in level of detail in accordance with the importance and safety classification of the systems
- Provide Subsurface Facility design support for the Safety Analyses and for the design basis events analyses for subsurface facilities
- Develop analyses for Ex-Container Systems, addressing technical issues such as backfill and invert material properties, invert configuration and drip shield interface, chemical content of committed materials, drip shield emplacement
- Develop analyses for the Waste Emplacement System, including the emplacement gantry, instrumentation and controls for waste emplacement, and the transporter safety system
- Develop analyses for Ground Control Systems, including ground control for emplacement and non-emplacement drifts, longevity of emplacement drift materials, earthquake effects on ground control
- Develop analyses for Subsurface Ventilation Systems, including the overall ventilation system, ventilation monitoring and control, and emplacement ventilation
- Provide support for addressing comments from the Nuclear Regulatory Commission, State of Nevada, and other organizations affected by the Site Recommendation
- Provide support for writing and reviewing Site Recommendation related documentation

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.2.5

TITLE: Waste Package Design Description

OBJECTIVE: Develop design methodologies to determine criticality, thermal, shielding, and structural processes that will be applied to all designs to complete a waste package design description and waste form description to serve as input to the Site Recommendation.

DESCRIPTION OF WORK: All efforts required to:

- Develop design analysis methodologies (e.g., structural, shielding, criticality, thermal) for waste package and drip shield designs
- Analyze and identify waste package and drip shield dimensions and materials necessary to demonstrate compliance with requirements (e.g., safety, interface), as defined in Section 1 of the system design descriptions. Develop drawings, as needed
- Develop fabrication and verification technologies to demonstrate that the waste packages and drip shields can perform as required
- Provide engineering design analyses to develop and evaluate alternative waste package concepts, including thermal, structural, criticality, shielding, economic, and other analyses

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.2.6

TITLE: System Element for Design

OBJECTIVE: Provide design integration of technical products that support Volume 1 of the Site Recommendation.

DESCRIPTION OF WORK: All efforts required to:

- Develop and maintain accurate and thorough project-level technical requirements documents
- Support development of program-level requirements documents, including quality reviews and project-level document impact analyses
- Conduct requirements traceability analyses for all design packages and documentation associated with the design, and ensure that all documents contain accurate and thorough traceability and flowdown
- Provide requirements interpretation and guidance to all program participants
- Analyze functional interfaces to define interface requirements and ensure compatibility of resulting designs

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.2.7

TITLE: Technical Support

OBJECTIVE: The Yucca Mountain Site Characterization Office has executed a cooperative agreement with the University and Community College System of Nevada to promote independent data collection related to the characterization of Yucca Mountain.

DESCRIPTION OF WORK: All efforts required to:

- Conduct basic research and engineering tasks consistent with site characterization and performance confirmation activities

- Provide for a collaborative interaction between the faculty and the national laboratories, U.S. Geological Survey, and Management and Operating Contractor organization. Support short-term missions of site characterization and long-term performance confirmation activities, as appropriate

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3

TITLE: Suitability Criteria Compliance Evaluation

OBJECTIVE: Conduct and complete testing, analysis, modeling and performance assessment for the preclosure and postclosure periods. Evaluate compliance of the Yucca Mountain site with applicable suitability criteria.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate compliance with the applicable suitability criteria under the Nuclear Waste Policy Act of 1982, Section 113(b)(1)(A)(iv)
- Complete Total System Performance Assessment for the Site Recommendation analyses and documentation
- Complete a preliminary preclosure safety evaluation
- Develop, maintain, and revise process model reports
- Complete other work necessary to support a preliminary evaluation of compliance with the site suitability criteria, and develop Volume 2 of the Site Recommendation Consideration Report
- Provide technical support to the work elements above, as appropriate

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.1

TITLE: Site Recommendation Report, Volume 2, Compliance Evaluation
(SR Vol 2—Compliance Evaluation)

OBJECTIVE: Evaluate compliance of the Yucca Mountain site with the applicable suitability criteria.

DESCRIPTION OF WORK: All efforts required to:

- Develop and produce Volume 2 of the Site Recommendation Consideration Report and, if appropriate, the Site Recommendation, including:
  - Introduction and Scope
  - Preliminary Suitability Evaluation for the Postclosure System Guideline of 10 CFR 963
  - Preliminary Suitability Evaluation for the Preclosure System Guideline of 10 CFR 963
- Provide support in receiving, sorting, cataloging, and addressing public comments
- Ensure the evaluation is technically and legally defensible in fulfilling the requirements of the Nuclear Waste Policy Act of 1982 and the applicable regulatory requirements, including the suitability criteria under Nuclear Waste Policy Act of 1982, 113(b)(1)(A)(iv) and the applicable radiation protection standards

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.2

TITLE: Total System Performance Assessment-Site Recommendation Model Development, Analyses, and Documentation (TSPA-SR Model Development, Analyses & Doc)

OBJECTIVE: Produce a Total System Performance Assessment–Site Recommendation. The Total System Performance Assessment–Site Recommendation will document the models and analyses utilized to evaluate the long-term performance of the total repository system. The Total System Performance Assessment–Site Recommendation document will provide technical input to the Site Recommendation Consideration Report, the final Site Recommendation Report, and the Final Environmental Impact Statement.

DESCRIPTION OF WORK: All efforts required to:

- Develop the Total System Performance Assessment–Site Recommendation models
- Complete the analyses of those models
- Complete documentation required to present the results and conclusions.
- Complete the documentation of the features, events, and processes that are either included or excluded from the Total System Performance Assessment–Site Recommendation

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.4

TITLE: Preclosure Safety Assessment

OBJECTIVE: Provide a preclosure safety assessment.

DESCRIPTION OF WORK: All efforts required to:

- Perform a preliminary safety analysis to support Site Recommendation sufficiency arguments (preclosure safety evaluation). The preliminary safety analysis report will summarize the processes used to identify potential design basis events, identify preventive and/or mitigating features, and evaluate potential consequences of design basis event scenarios. Preliminary results that summarize bounding design basis event scenarios will be included in the report

- Develop strategies to address preclosure criticality control, fire protection, and radiological worker safety

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.5

TITLE: Technical Support

OBJECTIVE: Perform Nye County independent technical activities.

DESCRIPTION OF WORK: All efforts required to:

- Complete the Early Warning Drilling Program to obtain saturated zone characterization data south of Yucca Mountain, that includes instrumenting new and existing boreholes, analyzing the geology and geochemistry of drill cuttings, monitoring, data analysis, and numerical modeling activities to address the concerns of Nye County

- Investigate uncertainties in how water moves from the land surface to the water table and how it moves in the water table

- Measure temperature, pressure, humidity and wind speed within the Exploratory Studies Facility tunnel and Enhanced Characterization of the Repository Block drift. Collect gas samples from the vadose zone to establish background conditions and to evaluate changes in the chemical composition of the gases

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.B

TITLE: Biosphere Process Model Report

OBJECTIVE: Conduct biosphere investigations, develop supporting analyses/models, and produce a full documented process model report.

DESCRIPTION OF WORK: Includes all efforts required to conduct and/or refine the following:

- Evaluate and screen biosphere features, events, and processes based on a well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-Site Recommendation and those that should be included

- Develop site-specific biosphere dose conversion factors for the average member of the critical group

- Describe the lifestyle and habits of the average member of the critical group who would be exposed to radioactive material at some time during the postclosure performance period

- Conduct data and software qualification and model validation

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.D

TITLE: Disruptive Events Process Model Report

OBJECTIVE: Conduct disruptive events investigations, develop supporting analyses/models, and produce a full documented process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen tectonic features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment and those that should be included
- Summarize the conceptual framework for volcanism at Yucca Mountain
- Provide the data necessary for an analysis and assessment of repository performance with respect to the possibility of tectonic processes and events
- Conduct data and software qualification and model validation
- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.E

TITLE: Engineered Barrier System Degradation Process Model Report (EBS Degradation Process Model Report)

OBJECTIVE: Conduct engineered barrier system investigations, develop supporting analyses/models, and produce a full documented process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen engineered barrier system features, events, and processes based on a well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-Site Recommendation and those that should be included

- Describe the engineered barrier system degradation, and identify and evaluate the physical and chemical processes that influence the flow and transport of radionuclides once the engineered barrier system has been degraded

- Perform analyses and prepare topical reports giving design-related rock thermal and mechanical properties and describing how these properties were determined from field and laboratory measurements

- Conduct data and software qualification and model validation

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.F

TITLE: Waste Form Degradation Process Model Report

OBJECTIVE: Conduct waste form degradation investigations and supporting analyses/models, and produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen waste form degradation features, events, and processes based on a well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-Site Recommendation and those that should be included

- Describe the waste form degradation, and identify the physical and chemical processes that influence the waste form properties, degradation rates, failure modes, all relevant cladding failure modes, bounding waste form degradation rates, radionuclide solubility and mobilization (including transport through perforations and crevices), secondary phase formation, and stability

- Conduct data and software qualification and model validation

- Develop a model containing the baseline waste form properties and characteristics of glass high-level waste and commercial spent nuclear fuel that predict the postclosure performance of all waste forms in the program baseline

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.I

TITLE: Integrated Site Process Model Report

OBJECTIVE: Conduct surface and subsurface site investigations and supporting analyses/ models, and integrate the results to produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen surface and subsurface features, events, and processes based on a well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-Site Recommendation and those that should be included

- Develop and evaluate an integrated site model that is a three-dimensional, computer-based representation of site geology, selected hydrologic and rock properties, and mineralogic characteristics data. Incorporate data from surface geologic mapping, project boreholes, measured stratigraphic sections, gravity profiles, and seismic profiles

- Conduct field studies, including surface and subsurface geophysical surveys and geologic mapping on the surface and in the Exploratory Studies Facility, to characterize the geologic framework of the Yucca Mountain site

- Conduct data and software qualification and model validation

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.N

TITLE: Near-Field Environment Process Model Report

OBJECTIVE: Conduct near-field environment investigations and supporting analyses/ models, and integrate the results to produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen near-field environment features, events, and processes based on a well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-Site Recommendation and those that should be included

- Conduct in situ thermal tests in the Exploratory Studies Facility and integrate with the thermal test data previously collected in site characterization. In situ thermal testing activities for Site Recommendation include the continuance of the Drift-Scale Test.

- Develop and document the necessary thermohydrology, thermohydrochemistry and thermomechanical models for the rocks surrounding the drift and affected by the waste-generated heat.

- Conduct data and software qualification and model validation

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.P

TITLE: Waste Package Degradation Process Model Report (Waste Pkg Degradation Process Model Report)

OBJECTIVE: Conduct waste package degradation investigations and supporting analyses/ models, and integrate the results to produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen waste package degradation features, events, and processes based on a well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-Site Recommendation and those that should be included

- Describe the waste package degradation and identify and evaluate the physical and chemical processes that influence the waste package material properties, degradation rates, failure modes, baseline material properties, and characteristics

- Conduct data and software qualification and model validation

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.S

TITLE: Saturated Zone Flow and Transport Process Model Report (SZ Flow & Transport Process Model Report)

OBJECTIVE: Conduct saturated zone flow and transport investigations and supporting analyses/ models, and integrate the results to produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen saturated zone flow and transport system features, events, and processes based on a well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-Site Recommendation and those that should be included
- Characterize the saturated zone system through testing, analysis, and modeling
- Develop the Saturated Zone Flow and Transport models, the analyses that will be completed using the models
- Document all associated Analysis and Model Reports that will be input to the Saturated Zone Flow and Transport Process Model Report
- Conduct data and software qualification and model validation
- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.3.U

TITLE: Unsaturated Zone Flow and Transport Process Model Report (UZ Flow & Transport Process Model Report)

OBJECTIVE: Conduct unsaturated zone flow and transport investigations and supporting analyses/ models, and integrate the results to produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen unsaturated zone flow and transport system features, events, and processes based on a well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-Site Recommendation and those that should be included
- Characterize the unsaturated zone system through testing analyses, and modeling
- Develop the Unsaturated Zone Flow and Transport models, the analyses that will be completed using these models, and the documentation required presenting the results and conclusions
- Document all associated Analysis and Modeling Reports that will be input to the Unsaturated Zone Flow and Transport Process Model Report
- Conduct data and software qualification and model validation
- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.4

TITLE: Summary of Views and Nuclear Regulatory Commission Sufficiency Comments (Summary of Views and NRC Sufficiency Comments)

OBJECTIVE: Provide a summary of views including Nuclear Regulatory Commission sufficiency comments, and provide other appropriate information

DESCRIPTION OF WORK: All efforts required to:

- Complete solicitation, receipt, tracking, disposition, and responses to the views and comments of the public, States, and affected tribes
- Complete interactions and documentation necessary to receive the Nuclear Regulatory Commission's sufficiency comments
- Identify and provide such other information as the Secretary considers appropriate for the Site Recommendation

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.5

TITLE: Technical and Regulatory Implementation

OBJECTIVE: Provide technical and regulatory implementation support.

DESCRIPTION OF WORK: All efforts required to:

- Support work associated with site facilities management,and testing and monitoring activities
- Perform work associated with implementation of the Integrated Safety Management System, safety and health core program, and environmental compliance program
- Perform work associated with document management, information management, and requirements traceability
- Perform work associated with project schedule and budget management, including annual planning, and configuration management of the project baseline
- Maintain a database for identifying, tracking, and managing Department of Energy commitments, comments, and decisions
- Perform support services, as directed by Department of Energy, to include management and technical, information management, legal advisory and assistance, safeguards and security, and education programs

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.5.2

TITLE: Environmental, Safety and Health Implementation (Environmental, Safety & Health Implementation)

OBJECTIVE: The Environment, Safety, and Health Implementation element comprises two areas of support of the Site Recommendation. These include Safety and Health Core Program and Environmental Compliance Program Implementation.

DESCRIPTION OF WORK: All efforts required to:

- Comply with federal and state environmental requirements and regulations, including those related to radiation protection monitoring
- Prepare project documents and reviews to address environmental issues
- Maintain the Integrated Safety Management System

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.5.3

TITLE: Technical and Regulatory Information Management (Technical & Regulatory Information Mgt)

OBJECTIVE: Provide technical and regulatory information management implementation in support of Site Recommendation activities.

DESCRIPTION OF WORK: All efforts required to manage and support technical information supporting Site Recommendation, including:

- Information Management—Information systems, network, desktop support, Internet/Intranet, and operations
- Document Management—Records management, project document support, document control, and electronic publishing
- Data Management—Technical information and data tracking management

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.5.4

TITLE: Baseline Control

OBJECTIVE: Provide management support, planning, and baseline control implementation of Yucca Mountain Site Characterization Project Management and Operating Contractor activities in support of the Site Recommendation.

DESCRIPTION OF WORK: All efforts required to:

- Deveop and maintain the cost and schedule
- Maintain the technical baseline
- Provide project management support in the areas of cost and schedule planning and control, development of management practices and procedures, and management information systems
- Collect project management planning and control data; develop, implement, and maintain computerized cost, schedule, and technical milestone databases; and develop strategies for meeting management information requirements

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.5.5

TITLE: Commitments, Comments and Decisions Management (Commitments, Comments & Decisions Mgt)

OBJECTIVE: Provide systems for identifying, tracking, and managing Department of Energy commitments, comments, and decisions.

DESCRIPTION OF WORK: All efforts required to:

- Support management and integration of regulatory strategies, identification of requirements inherent in those strategies, development of plans to implement those strategies, and maintenance of traceable documentation of decisions made to implement those strategies

- Provide a system for cataloging, tracking, and compiling comments on the Site Recommendation. Provide for comment collection, processing, response, and disposition

- Provide a system to enter, develop responses to, and track commitments to final disposition consistent with the formal commitment disposition process, as described in YAP 30.3, *Disposition of Regulatory Commitments and Obligations*

- Identify potential commitments between the Department of Energy and the Nuclear Regulatory Commission, SCA open items, issue resolution status reports, study plans, quality assurance, environmental, peer review boards, consultant boards, Nuclear Waste Technical Review Board, Advisory Committee on Nuclear Waste, other federal agencies, state and local agencies, and the Occupational Safety and Health Administration/Mine Safety and Health Administration

- For the comments, commitments, and decisions systems:

  – Provide the resources to operate, update and maintain the databases

  – Provide the necessary processes and controls to ensure data accuracy, integrity, and traceability

  – Ensure traceability, accuracy, and completeness

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.5.6

TITLE: Technical, Management and Operational Support (Technical, Management & Operational Support)

OBJECTIVE: Provide support services, as directed by the Department of Energy, including management and technical support, information management support, legal advisory and assistance, safeguards and security support, and education programs.

DESCRIPTION OF WORK: All efforts required to:

- Provide management and technical support services to the Yucca Mountain Site Characterization Office
- Provide information management support to Yucca Mountain Site Characterization Office and direct support services contractors
- Provide security services for Yucca Mountain Site Characterization Office and project participants located in Las Vegas, Nevada, and at the Nevada Test Site
- Provide legal advisory support services

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.5.S

TITLE: Construction Services and Facilities Operations (Construction Services & Facilities Ops)

OBJECTIVE: Provide site facilities operations.

DESCRIPTION OF WORK: All efforts required to:

- Provide direct test support, setup, and general services for construction test support
- Provide general services for support, visitor access, and the Exploratory Studies Facility operations and maintenance
- Provide basic infrastructure and services to support site characterization field operations

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.5.T

TITLE: Testing and Monitoring Activities (Testing & Monitoring Activities)

OBJECTIVE: Conduct testing and monitoring and provide data for Site Recommendation.

DESCRIPTION OF WORK: All efforts required to:

- Conduct hydrologic testing, thermal testing, surface-based borehole monitoring, field work in support of the natural analogues studies, and technical coordination and support of all testing and monitoring activities
- Provide support for surface and subsurface projects funded under the cooperative agreement with the University and Community College System of Nevada
- Characterize the soil and rock at and near the surface to provide geotechnical information for Site Recommendation

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.6

TITLE: Business Processes

OBJECTIVE: Provide administration, institutional interactions, and administrative support activities.

DESCRIPTION OF WORK: All efforts required to:

- Provide support for business activities, security, information management planning and compliance, training, and litigation management

- Provide institutional interactions support, including public interface and information dissemination activities

- Provide administrative support services to Yucca Mountain Site Characterization Office personnel, telecommunications services to all Las Vegas and Nevada Test Site-based participants, budget and services relating to lease renewals, and security clearance investigations

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.6.1

TITLE: Administration

OBJECTIVE: Provide administration support, including business activities, security, information management planning and compliance, training, and litigation management.

DESCRIPTION OF WORK: All efforts required to:

- Support business activities by providing procurement, property management, other business services, facilities, equipment maintenance, mail distribution for the Yucca Mountain Site Characterization Office, Las Vegas-based motor pool services, facility lease costs for U.S. Geological Survey staff in support of the Yucca Mountain Project, and operational management to support all telecommunications activities

- Implement and manage physical protection systems, information security, personnel security, and counterintelligence; and support the Yucca Mountain Site Characterization Office Safeguards and Security Program

- Support information management planning and compliance activities, including information technology planning, acquisition, implementation, operation, maintenance, and information security

- Plan, develop, and implement all training functions

- Support contractor litigation management activities

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.6.2

TITLE: Institutional Interactions

OBJECTIVE: Provide institutional interactions support, including public interface and information dissemination activities.

DESCRIPTION OF WORK: All efforts required to:

- Plan, develop, and coordinate the dissemination of information to Yucca Mountain Site Characterization Office stakeholders, media, and the public
- Provide rent and facility maintenance for the Yucca Mountain Site Characterization Project science centers
- Provide public support for public meetings and hearings

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.21.6.3

TITLE: Administrative Support

OBJECTIVE: Provide administrative support services and telecommunications services; budget and services relating to lease renewals; and security clearance investigations.

DESCRIPTION OF WORK: All efforts required to:

- Provide administrative, secretarial, receptionist, reproduction, and word processing services, logistics support, and facilities support for Yucca Mountain Site Characterization Office personnel

- Provide telecommunications services to all Las Vegas and Nevada Test Site-based Yucca Mountain Site Characterization Project contractors

- Reserve budget for termination liabilities for lease renewals in accordance with Office of Management and Budget Circular A-11

- Conduct security clearance investigations

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22

TITLE: License Application

OBJECTIVE: Produce and provide a License Application.

DESCRIPTION OF WORK: All efforts required to:

- Produce and provide the general information and Safety Analysis Report portions of the License Application
- Produce and provide supporting documentation that serves as the basis for the information in the License Application, including:
  - safeguards and security plans
  - Yucca Mountain Site Description
  - surface, subsurface, and waste package design descriptions
  - system element for design
  - preclosure safety assessment
  - Total System Performance Assessment- License Application model development, analyses, and documentation
  - Integrated Site Model, Unsaturated Zone Flow and Transport, Near-Field Environment, Engineered Barrier System Degradation, Waste Package Degradation, Waste Form Degradation, Saturated Zone Flow and Transport, Disruptive Events and Biosphere Process Model Reports
  - radiation protection program description
  - Performance Confirmation Program Plan
  - Land Ownership and Control Plan
  - operational plans
  - records maintenance program description

WBS: 1.2.22 (Continued)

- Produce and provide semiannual progress reports

- Provide technical and regulatory implementation support, including:

  - testing and monitoring activities
  - construction services and facilities operation
  - environmental, safety, and health implementation
  - technical and regulatory information management
  - baseline control
  - commitments, comments, and decisions management
  - technical management and operational support

- Provide business processes support, including:

  - administration
  - institutional interactions
  - administrative support

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.1

TITLE: General Information

OBJECTIVE: Produce and provide the general information portion of the License Application.

DESCRIPTION OF WORK: All efforts required to:

- *General Information*—Preparation, review, and verification of draft and final input to the general information portion of the License Application

- *Safeguards and Security Plans*—Preparation and review of the Safeguards and Security Plans that will provide a basis for the summary information to be provided in the general information portion of the License Application

- *Progress Reports*—Preparation and review of the Progress Reports that will be prepared on a semiannual basis consistent with the requirements of the Nuclear Waste Policy Act of 1982, Section 113(b), and the Interim Licensing Guidance, Section 16(b), or the final 10 CFR 63

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.1.1

TITLE: General Information for License Application

OBJECTIVE: Produce the general information portion of the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Prepare, review (Department of Energy, Management and Operating Contractor, and U.S. Geological Survey), verify, and revise the general information portion of the License Application

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.1.2

TITLE: Safeguards and Security

OBJECTIVE: Prepare the safeguards and security products, which are used as a basis for the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Update the Monitored Geologic Repository Vulnerability Assessment
- Prepare the Monitored Geologic Repository Safeguards and Security Plans

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.1.3

TITLE: Progress Reports

OBJECTIVE: Produce and provide semiannual progress reports and annual updates to the Documentation of Program Change.

DESCRIPTION OF WORK: All efforts required to:

- Prepare, coordinate, review, revise, and produce multiple progress reports on a semiannual basis

- Prepare and produce annual updates to the Documentation of Program Change

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.2

TITLE: Site Description

OBJECTIVE: Produce and provide the site description portion of the License Application and the supporting documentation.

DESCRIPTION OF WORK: All efforts required to:

- *Description of the Site for License Application*—Support preparation of the site description consistent with the guidance provided in the License Application Technical Guidance Document and in accordance with the requirements of the Interim Licensing Guidance, Section 21(c)(1), or the final 10 CFR 63

- *Yucca Mountain Site Description*—Support preparation of a revision of the Yucca Mountain Site Description, which will provide an integrated discussion of what has been learned about the natural system at Yucca Mountain and an assessment of natural and anthropogenic analogs that may provide insights or applicable information to analyzing long-term repository performance

- *Technical Support*—Lawrence Livermore National Laboratory special projects and the University and Community College System of Nevada cooperative agreement

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.2.1

TITLE: Description of the Site for License Application (Description of the Site for LA)

OBJECTIVE: Produce the site description portion of the License Application and Seismic Topical Report III.

DESCRIPTION OF WORK: All efforts required to:

- Prepare, review, verify, and revise the site description portion of the License Application
- Prepare Seismic Topical Report III, resolve Department of Energy comments, and submit the Department of Energy-approved report to the Nuclear Regulatory Commission
- Interact with Nuclear Regulatory Commission during their review of Seismic Topical Report III, and revise Seismic Topical Report III (if required) as a result of Nuclear Regulatory Commission's review

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.2.2

TITLE: Yucca Mountain Site Description

OBJECTIVE: Prepare a Yucca Mountain Site Description report.

DESCRIPTION OF WORK: All efforts required to:

- Complete the Yucca Mountain Site Description for License Application, which will provide an integrated discussion of what has been learned about the natural system at Yucca Mountain and serve as a technical basis for preparing the site description portion of the License Application

- Include in the Yucca Mountain Site Description for License Application, information on the geography and demography of the site; nearby industrial, transportation, and military facilities; geology, hydrology, climatology, meteorology, geochemistry, and near-field effects; and natural analogues

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.2.3

TITLE: Technical Support

OBJECTIVE: Promote independent data collection related to the performance of the potential Yucca Mountain repository reporting through a cooperative agreement between the Yucca Mountain Site Characterization Office and the University and Community College System of Nevada.

DESCRIPTION OF WORK: All efforts required to:

- Conduct basic independent research and engineering tasks consistent with site characterization activities and performance confirmation

- Provide for a collaborative interaction between the faculty and the national laboratories, U.S. Geological Survey, and Management and Operating Contractor. Support short-term missions of long-term performance confirmation activities, as appropriate

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.3

TITLE: Repository and Waste Package Design

OBJECTIVE: Produce and provide the repository and waste package design methodology portion of the License Application and the supporting documentation.

DESCRIPTION OF WORK: All efforts required to:

- Complete surface, subsurface, and waste package design and system engineering for License Application:
  - *Design Input for* License Application—Prepare and review design-related input required for the Safety Analysis Report in accordance with the Interim Licensing Guidance, Section 21(c), or the final 10 CFR 63 and the guidance provided in the Technical Guidance Document
  - *Surface Design Description*—All work associated with the facilities and processes required for waste handling, from receipt to underground emplacement
  - *Subsurface Design Description*—All work associated with the subsurface facilities and systems, including drift architecture, waste emplacement, and engineered barriers for long-term waste isolation
  - *Waste Package Design Description*—All work associated with the waste package designs, design methodology (including criticality analysis methodology), and fabrication/verification technologies
  - *System Element for Design*—Develop and maintain design requirements and criteria, as well as system engineering integration tasks

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.3.1

TITLE: Design Input for License Application (Design Input for LA)

OBJECTIVE: Produce the design portion of the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Prepare, review (Department of Energy, Management and Operating Contractor, and U.S. Geological Survey), verify, and revise the design information portion of the License Application

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.3.2

TITLE: Surface Design Description

OBJECTIVE: Produce a surface facility engineering design description, and provide it as input to the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Develop the Waste Handling Building Foundation and Framing Plans, including defining the vertical and horizontal major loads, and computer models that reflect the proposed structure

- Develop the Waste Handling Building General Arrangement Plan, including development of process flow diagrams, descriptions of major equipment and support systems, and shielding and configuration analyses

- Develop general system descriptions for the carrier/cask handling system, assembly transfer system, canister transfer system, waste package remediation system, disposal container handling system, electric, heating, ventilating, air conditioning, fire protection and radiological waste systems, and the waste treatment building

- Provide the design products to support the safety analyses, which include process flows (for systems involving the handling of radioactive materials), general arrangement diagrams, general system descriptions, and concepts of operations

- Provide the documentation required to support the design basis event process as necessary to enable the design basis event analyzers to prepare the technical documents for each design basis event relevant to the Surface Facilities

- Develop System Design Descriptions. Section I, "Functions and Design Criteria," information includes applicable codes and standards, design criteria, and general system descriptions. Section II, "Design Description," information includes applicable codes and standards, design criteria, general system descriptions, system design, and system arrangements

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.3.3

TITLE: Subsurface Design Description

OBJECTIVE: Produce a subsurface facility engineering design description, and provide it as input to the License Application.

DESCRIPTION OF WORK: All efforts required to provide the following:

- *Ground Control* – Develop the figures needed to support design of the ground control system, including ground control for the emplacement drifts, mains, shafts, and other subsurface facilities

- *Subsurface Ventilation* – Develop the necessary design documents (analyses, figures, calculations or reports) needed to support design of the subsurface ventilation system, including ventilation of the emplacement areas, the development sections, all mains and shafts and all other required subsurface facilities

- *Waste Emplacement* – Develop the necessary design documents (analyses, figures, calculations or reports) needed to support design of the waste transportation and emplacement system, including subsurface transportation of the work package, any required transfer and docking facilities, and the emplacement methods and equipment. Subsurface Safety and Monitoring

- *Waste Retrieval* – Develop the necessary design documents (analyses, figures, calculations or reports) needed to support design of the waste retrieval system, including equipment, methods, controls, and other required components to provide normal and abnormal retrieval operations

- *Performance Confirmation* – Develop the necessary design documents (analyses, figures, calculations or reports) needed to support design of the Performance Confirmation system, including invert monitoring, inspection vehicles and equipment, and computer code development

- *Sealing and Closure* – Develop design analysis sufficient to describe the closure activities, including protection of waste package integrity promoted by in-drift activities such as backfilling, development of capillary barriers, placement of drip shields, and sealing of the repository openings to the surface such as monitoring boreholes, access ramps, and ventilation shafts

WBS: 1.2.22.3.3 (Continued)

- *Subsurface Integrated Control System* – Develop the integrated control system, software development, and the communications systems used to control the emplacement activities

- Develop the components and systems related to controlling and monitoring radiological conditions in the subsurface operational areas, including refining designs, providing design analyses, and describing systems in sufficient detail to understand their functions and capabilities

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.3.4

TITLE: Waste Package Design Description

OBJECTIVE: Develop waste package and drip shield design concepts. Develop design methodologies necessary to perform criticality, thermal, shielding, and structural analyses that will be applied to all waste package and drip shield designs to complete a waste package design description and waste form description to serve as input to the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Develop design analysis methodologies (e.g., structural, shielding, criticality, thermal) for waste package and drip shield designs
- Analyze and identify the waste package and drip shield dimensions and materials necessary to demonstrate compliance with requirements (e.g., safety, interface), as defined in Section 1 of the system design description. Develop drawings, as needed
- Provide input to the Total System Performance Assessment- License Application
- Develop fabrication and verification technologies to demonstrate that the waste packages and drip shields can perform as required
- Provide engineering design analyses to develop and evaluate alternative waste package concepts, including thermal, structural, criticality, shielding, economic, and other analyses

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.3.5

TITLE: System Element for Design

OBJECTIVE: Provide design integration of technical products that support the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Develop and maintain accurate and thorough technical requirements documents that provide the basis for the License Application design
- Conduct cross-cutting analysis/studies to resolve key technical issues and resolve uncertainties identified as to be verified, to be resolved, and to be determined, in the documents
- Perform verification of the License Application design and the supporting technical documentation for consistency and accuracy. Manage the configuration control of the Mined Geologic Repository design
- Develop/maintain documentation to support the management of the project technical baseline
- Provide engineering support to continue development and revision of the System Design Descriptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4

TITLE: Preclosure and Postclosure Performance

OBJECTIVE: Provide the preclosure safety assessment and postclosure performance assessment portion of the License Application and the supporting documentation.

DESCRIPTION OF WORK: All efforts required to:

- *Total System Performance Assessment Input for* License Application—Prepare and review the postclosure performance assessment portion of the License Application

- *Preclosure Safety Assessment for* License Application—Prepare and review the preclosure safety analysis (integrated safety analysis) portion of the License Application

- *TSPA-LA Model Development, Analyses, and Documentation*—Revise the Total System Performance Assessment for the Site Recommendation to provide the primary technical basis for demonstrating compliance with the applicable Nuclear Regulatory Commission postclosure performance objective and requirements

- *Process Model Reports*—Prepare and review any revisions to the Process Model Reports that will provide the bases and supporting documentation for completion of the Total System Performance Assessment and License Application

- *Preclosure Safety Assessment*—Complete and document the work associated with the preliminary preclosure safety analyses (integrated safety assessment) required to demonstrate compliance with the applicable Nuclear Regulatory Commission preclosure performance objectives and requirements

- *Technical Support*—Work performed by the Bureau of Reclamation, Nye County drilling program, and other Nye County technical programs

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.1

TITLE: Total System Performance Assessment Input for License Application (TSPA Input for LA)

OBJECTIVE: Produce the total system performance assessment (Total System Performance Assessment portion of the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Prepare, review (Department of Energy, Management and Operating Contractor, and U.S. Geological Survey), verify, and revise the Total System Performance Assessment portion of the License Application

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.2

TITLE: Preclosure Safety Assessment Input for License Application (Preclosure Safety Assessment for LA)

OBJECTIVE: Produce the preclosure safety assessment portion of the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Prepare, review (Department of Energy, Management and Operating Contractor, and U.S. Geological Survey), verify, and revise the preclosure safety assessment (integrated safety analysis) portion of the License Application

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.3

TITLE: Total System Performance Assessment-License Application Model Development, Analysis, and Documentation (TSPA-LA Model Devel, Analysis, and Doc)

OBJECTIVE: Produce a Total System Performance Assessment for the License Application. The Total System Performance Assessment for the License Application will document the models and analyses that evaluate total repository system performance. The Total System Performance Assessment for the License Application document will provide technical input to the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Develop the Total System Performance Assessment–License Application models
- Complete the analyses of those models
- Complete documentation required to present the results and conclusions
- Complete the documentation of the features, events, and processes that are either included or excluded from the Total System Performance Assessment–License Application

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.5

TITLE: Preclosure Safety Assessment

OBJECTIVE: Define project requirements and strategies to meet the Nuclear Regulatory Commission safety analysis requirements.

DESCRIPTION OF WORK: All efforts required to:

- Maintain and update hazards analyses (design basis event analysis/preclosure safety evaluation) that assesses potential hazards resulting from the evolving designs in support of License Application sufficiency arguments

- Develop/revise preliminary design basis events, and ensure that the preclosure safety analysis assessments are performed for all credible design basis events for the License Application design

- Perform an Integrated Safety Analysis in accordance with Nuclear Regulatory Commission requirements, identifying all safety classification of items and analyzes all Category 1 and Category 2 design basis event preclosure safety assessments for License Application design

- Develop safety requirements that implement the safety strategies to address criticality, fire hazards, and radiological worker safety for the License Application design

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.6

TITLE: Technical Support

OBJECTIVE: Perform Nye County independent technical activities.

DESCRIPTION OF WORK:

- Complete the Early Warning Drilling Program to obtain saturated zone characterization data south of Yucca Mountain, that includes instrumenting new and existing boreholes, analyzing the geology and geochemistry of drill cuttings, monitoring, data analysis, and numerical modeling activities to address the concerns of Nye County

- Investigate uncertainties in how water moves from the land surface to the water table and how it moves in the water table

- Measure temperature, pressure, humidity and wind speed within the Exploratory Studies Facility tunnel and ECRB drift. Collect gas samples from the vadose zone to establish background conditions and to evaluate changes in the chemical composition of the gases

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.7

TITLE: Performance Confirmation Testing and Assessment

OBJECTIVE: Implement the Performance Confirmation Plan

DESCRIPTION OF WORK:

- Obtain and assess performance confirmation data

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.B

TITLE: Biosphere Process Model Report

OBJECTIVE: Conduct biosphere investigations, develop supporting analyses/models, and update the process model report.

DESCRIPTION OF WORK: All efforts required to:

- Develop site-specific biosphere dose conversion factors for the average member of the critical group
- Describe the lifestyle and habits of the average member of the critical group who would be exposed to radioactive material at some time during the postclosure performance period
- Address the characteristics of the environment that influence the transport of radionuclides to humans
- Conduct literature reviews and assemble data needed to revise the process model report
- Evaluate available data and perform disruptive and nondisruptive sensitivity analyses
- Document the technical bases for the modeling and associated assumptions
- Evaluate and screen biosphere features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.D

TITLE: Disruptive Events Process Model Report

OBJECTIVE: Conduct disruptive events investigations, develop supporting analyses/models, and update the process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen tectonic features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included

- Develop the conceptual framework for volcanism and seismicity and structural deformation at Yucca Mountain

- Assess whether the tectonic events could produce significant changes in the existing hydrologic or geochemical properties of the rocks within the area that controls the flow and transport conditions

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV:

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.E

TITLE: Engineered Barrier System Degradation Process Model Report (EBS Degradation Process Model Report)

OBJECTIVE: Conduct engineered barrier system investigations, develop supporting analyses/models, and update the process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen engineered barrier system features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included

- Describe the engineered barrier system degradation, and identify the physical and chemical processes that influence the flow and transport of radionuclides once the engineered barrier system has been degraded

- Perform analyses and prepare topical reports giving design-related rock thermal and mechanical properties and describing how these were determined from field and laboratory measurements

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.F

TITLE: Waste Form Degradation Process Model Report

OBJECTIVE: Conduct waste form degradation investigations, develop supporting analyses/models, and update the process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen waste form degradation features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included

- Describe the waste form degradation, and identify the physical and chemical processes that influence the waste form properties, degradation rates, failure modes, all relevant cladding failure modes, bounding waste form degradation rates, radionuclide solubility and mobilization (including transport through perforations and crevices), secondary phase formation, and stability

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.I

TITLE: Integrated Site Process Model Report

OBJECTIVE: Conduct integrated site investigations, develop supporting analyses/models, and update the process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen integrated site features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included

- Maintain an integrated site model that is a three-dimensional, computer-based representation of site geology, selected hydrologic and rock properties, and mineralogic characteristics data

- Conduct surface and subsurface field investigations to provide additional information for updating the geologic framework, rock properties, and mineralogic components of the integrated site model

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.N

TITLE: Near–Field Environment Process Model Report

OBJECTIVE: Conduct near-field environment investigations, develop supporting analyses/models, and update the process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen near-field environment features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included

- Conduct in situ thermal tests in the Exploratory Studies Facility and integrate with the thermal test data collected earlier. In situ thermal testing activities for License Application include the continuance of the Drift-Scale Test and the execution of the cross drift tests.

- Develop and document necessary thermohydrology, thermohydrochemistry and thermomechanical models for the rocks surrounding the drift and affected by the waste-generated heat

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.P

TITLE: Waste Package Degradation Process Model Report (Waste Pkg Degradation Process Model Report)

OBJECTIVE: Conduct waste package degradation investigations and supporting analyses/ models, and produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen waste package degradation features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included

- Describe the waste package degradation, and identify the physical and chemical processes that influence the waste package material properties, degradation rates, failure modes, baseline material properties, and characteristics

- Evaluate relevant data and uncertainties associated with the waste package material, microbial-induced corrosion, phase stability, long-term aqueous and humid air corrosion rates, radiolysis-enhanced corrosion, stress corrosion cracking, hydrogen embrittlement, and corrosion environment

- Develop and document the model containing the baseline waste package material

- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.S

TITLE: Saturated Zone Flow and Transport Process Model Report (SZ Flow & Transport Process Model Report)

OBJECTIVE: Conduct saturated zone flow and transport investigations and supporting analyses/ models, and produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen saturated zone flow and transport features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included
- Characterize the saturated zone system through testing, analyses, and modeling
- Develop the saturated zone flow and transport models, analyses that will be completed using the models
- Document all associated analysis and modeling reports that will provide input to the Saturated Zone Flow and Transport Process Model Report
- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.4.U

TITLE: Unsaturated Zone Flow and Transport Process Model Report (UZ Flow & Transport Process Model Report)

OBJECTIVE: Conduct unsaturated zone flow and transport investigations and supporting analyses/ models, and produce a process model report.

DESCRIPTION OF WORK: All efforts required to:

- Evaluate and screen unsaturated zone flow and transport features, events, and processes based on well-defined and documented criteria to distinguish between features, events, and processes that can be excluded from the Total System Performance Assessment-License Application and those that should be included
- Characterize the unsaturated zone system through testing, analyses, and modeling
- Develop the unsaturated zone flow and transport models, analyses that will be completed using these models
- Document all associated analysis and modeling reports that will provide input to the Unsaturated Zone Flow and Transport Process Model Report
- Document the technical bases for the modeling and associated assumptions

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.5

TITLE: Licensee Plans, Programs and Other Information (Licensee Plans, Programs & Other Information)

OBJECTIVE: Produce and provide the licensee plans, programs, and other information portions of the License Application and the supporting documentation.

DESCRIPTION OF WORK: All efforts required to:

- *Description of Plans, Programs, and Other Information for LA*—Prepare the sections of the License Application that provide descriptions of the plans, programs, and other information required by the Nuclear Regulatory Commission

- *Performance Confirmation Program Plan*—Prepare and review the revised Performance Confirmation Plan, which addresses the Nuclear Regulatory Commission requirements and provides a basis for developing the description of the performance confirmation program required in the License Application

- *Operational Plans*—Develop and document the required information on plans for start-up testing, operations, permanent closure and alternative land use, retrieval and alternate storage, and permanent closure and decontamination or dismantlement of surface facilities, as well as identification and justification of probable subjects of license specifications

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.5.1

TITLE: Description of Licensee Plans, Programs, and Other Information for License Application (Description of Licensee PP&OI for LA)

OBJECTIVE: Produce the licensee plans, programs, and other information portions of the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Prepare, review (M&O, DOE, and USGS), verify, and revise the licensee plans, programs, and other information portions of the License Application

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.5.2

TITLE: Licensee Plans and Programs

OBJECTIVE: Produce personal computer and operations plans.

DESCRIPTION OF WORK: All efforts required to:

- Prepare and review updates of the Performance Confirmation Plan
- Develop and document required information on the plans for operations, and plans for retrieval and alternate storage of waste.

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6

TITLE: Technical and Regulatory Implementation

OBJECTIVE: Provide technical and regulatory implementation.

DESCRIPTION OF WORK: All efforts required for:

- *Environmental, Safety, and Health Implementation*—Peform work associated with environmental compliance program implementation, including radiological safety and monitoring, integrated safety management system, and the safety and health core program

- *Technical and Regulatory Information Management*—Perform work associated with the Licensing Support Network, data management, requirements traceability, document management, and information management

- *Baseline Control*—Perform work associated with the project schedule, budget control, planning, and configuration management of the project baseline, including the repository safety strategy, Technical Guidance Document, and License Application Management Plan

- *Commitments, Comments, and Decisions Management*—Support work associated with the database for identifying, tracking, and managing Department of Energy commitments, comments, and decisions

- *Technical Management and Operational Support*—Provide support services (e.g., Management and Technical Support Contractor, Atomic Energy of Canada Limited, National Academy of Sciences, Wackenhut Services Inc., University of Nevada at Reno [School to Work Program], information management services)

- *NEPA Compliance*–Provide NEPA procedural and technical expertise and assistance

- *Test Support and Construction Services*–Provide direct test support to test locations and provide construction services

- *Site Operation and Facility Stewardship*–Provide infrastructure, site operation, and facility management services

- *Testing and Monitoring Activities*—Support work associated with testing and monitoring activities conducted underground or at the surface to support the License Application and performance confirmation testing and analyses being conducted as part of the Performance Confirmation Program

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.2

TITLE: Environmental, Safety and Health Implementation (Environmental, Safety & Health Implementation)

OBJECTIVE: The Environment, Safety, and Health Implementation element comprises two areas in support of License Application. These include Safety and Health Core Program and Environmental Compliance Program Implementation.

DESCRIPTION OF WORK: All efforts required to:

- Comply with federal and state environmental requirements and regulations, including those related to radiation protection monitoring
- Prepare project documents and reviews to address environmental issues
- Maintain the Integrated Safety Management System

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.3

TITLE: Technical and Regulatory Information Management (Technical & Regulatory Information Management)

OBJECTIVE: Provide technical and regulatory information management implementation in support of License Application activities.

DESCRIPTION OF WORK: All efforts required to manage and support technical information supporting the License Application, including:

- *Information Management*—Work associated with information systems, network, desktop support, Internet/Intranet, and operations
- *Document Management*—Work associated with records management, project document support, document control, and electronic publishing
- *Data Management*—Work associated with technical information and data tracking management
- Perform all activities necessary to meet the requirements of 10 CFR 2, Subpart J

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.4

TITLE: Baseline Control

OBJECTIVE: Provide management support, planning, and baseline control implementation of Yucca Mountain Site Characterization Project Management and Operating Contractor activities in support of the License Application.

DESCRIPTION OF WORK: All efforts required to:

- Develop and maintain the cost and schedule baseline
- Maintain the technical baseline
- Provide project management support in the areas of cost and schedule planning and control, development of management practices and procedures, and management information systems
- Collect project management planning and control data; develop, implement, and maintain computerized cost, schedule, and technical milestone databases; and develop strategies for meeting management information requirements

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.5

TITLE: Commitments, Comments, and Decisions Management (Commitments, Comments, and Decisions Mgt)

OBJECTIVE: Provide systems for identifying, tracking, and managing Department of Energy commitments, comments, and decisions.

DESCRIPTION OF WORK: All efforts required to:

- Provide a system for cataloging, tracking, and compiling regulatory interactions on the License Application, including requests for additional information during the licensing process. Provide for request/comment collection, processing, response, and disposition

- Provide a system to enter, develop responses to, and track commitments to final disposition consistent with the formal commitment disposition process, as described in YAP 30.3, *Disposition of Regulatory Commitments and Obligations*

- Identify potential commitments between the Department of Energy and the Nuclear Regulatory Commission, SCA open items, issue resolution status reports, study plans, quality assurance, environmental, peer review boards, consultant boards, Nuclear Waste Technical Review Board, Advisory Committee on Nuclear Waste, other federal agencies, state and local agencies, and the Occupational Safety and Health Administration/Mine Safety and Health Administration

- For the comments, commitments, and decisions systems:

  – Provide the resources to operate, update, and maintain the databases

  – Provide the necessary processes and controls to ensure data accuracy, integrity, and traceability

  – Ensure traceability, accuracy, and completeness

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.6

TITLE: Technical, Management and Operational Support (Technical, Management & Operational Support)

OBJECTIVE: Provide support services, as directed by the Department of Energy, including management and technical support, information management support, legal advisory and assistance, safeguards and security support, and education programs.

DESCRIPTION OF WORK: All efforts required to:

- Provide management and technical support services to the Yucca Mountain Site Characterization Office
- Provide information management support to Yucca Mountain Site Characterization Office and direct support services contractors
- Provide security services for Yucca Mountain Site Characterization Office and project participants located in Las Vegas, Nevada, and at the Nevada Test Site
- Provide legal advisory and assistance

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.7

TITLE: National Environmental Policy Act Compliance

OBJECTIVE: Implement and support National Environmental Policy Act of 1969 requirements.

DESCRIPTION OF WORK: All efforts required to:

- Provide National Environmental Policy Act of 1969 procedural and technical expertise and assistance, semiannual environmental assessment reports, consultations and coordinations required by law, and annual reports on implementation of the Mitigation Action Plan.

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.C

TITLE: Test Support and Construction Services

OBJECTIVE: Provide construction and test support.

DESCRIPTION OF WORK: All efforts required to:

- Provide direct test support for test locations, cross drift alcove and niche construction, and test set-up services necessary to support the License Application process and visitor access

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.S

TITLE: Site Operations and Facility Stewardship

OBJECTIVE: Provide infrastructure services for the site and other facilities.

DESCRIPTION OF WORK: All efforts required to:

- Provide direct test support and setup and general services for construction test support
- Provide the basic infrastructure and services to support site characterization field operations and construction and visitor access. Activities include maintaining a Conduct of Operations Program and Life Cycle Asset Management
- Provide the work necessary to provide the basic infrastructure and services to support the License Application process and visitor access

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.6.T

TITLE: Testing and Monitoring Activities (Testing & Monitoring Activities)

OBJECTIVE: Conduct testing and monitoring activities and provide data.

DESCRIPTION OF WORK: All efforts required to:

- Conduct hydrologic testing, thermal testing, saturated zone testing in cooperation with Nye County, surface-based borehole monitoring, field work in support of the natural analogues studies, and technical coordination and support of all testing and monitoring activities

- Provide support for surface and subsurface projects funded under the cooperative agreement with the University and Community College System of Nevada

- Sample the soil and rock at and near the surface to provide geotechnical information for the design issues

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.7

TITLE: Business Processes

OBJECTIVE: Provide administration, institutional interactions, and administrative support activities.

DESCRIPTION OF WORK: All efforts required to:

- Provide support for business activities, safeguards and security, information management planning and compliance, training, and litigation management

- Provide institutional interactions support, including public interface and information dissemination activities

- Provide administrative support services to Yucca Mountain Site Characterization Office personnel, telecommunications services to all Las Vegas and Nevada Test Site-based participants, budget and services relating to lease renewals, and security clearance investigations

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.7.1

TITLE: Administration

OBJECTIVE: Provide support including business activities, safeguards and security, information management planning and compliance, training, and litigation management.

DESCRIPTION OF WORK: All efforts required to:

- Support business activities by providing procurement, property management, other business services, facilities, equipment maintenance, and mail distribution for the Yucca Mountain Site Characterization Office, Las Vegas-based motor pool services, facility lease costs for U.S. Geological Survey staff in support of the Yucca Mountain Project, and operational management to support all telecommunications activities

- Implement and manage the physical protection, information security, personnel security, counterintelligence systems, and material control and accounting; and support the Yucca Mountain Site Characterization Office Safeguards and Security Program

- Support information management planning and compliance activities, including information technology planning, acquisition, implementation, operation, maintenance, and information security

- Plan, develop, implement all training functions

- Support contractor litigation management activities

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.7.2

TITLE: Institutional Interactions

OBJECTIVE: Provide institutional interactions support, including public interface and information dissemination activities.

DESCRIPTION OF WORK: All efforts required to:

- Plan, develop, and coordinate the dissemination of information to Yucca Mountain Site Characterization Office stakeholders, media, and the public
- Provide rent and facility maintenance for the Yucca Mountain Site Characterization Project science centers
- Facilitate public affairs emergency planning
- Provide logistical support for public meetings and hearings

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.7.3

TITLE: Administrative Support

OBJECTIVE: Provide administrative support and telecommunications services; budget and services relating to lease renewals; and security clearance investigations.

DESCRIPTION OF WORK: All efforts required to:

- Provide administrative, secretarial, receptionist, reproduction, and word processing services, logistics support, and facilities support for Yucca Mountain Site Characterization Office personnel

- Provide telecommunications services to all Las Vegas and Nevada Test Site-based Yucca Mountain Site Characterization Project contractors

- Reserve budget for termination liabilities for lease renewals in accordance with Office of Management and Budget Circular A-11

- Conduct security clearance investigations

CR:
APPROVED:
Rev 00:

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.22.8

TITLE: Integrated License Application

OBJECTIVE: Provide the License Application to the Nuclear Regulatory Commission and obtain a construction authorization

DESCRIPTION OF WORK: All efforts required to:

- All activities involving the assembled License Application document, interactions with the Nuclear Regulatory Commission from the submittal of the License Application until construction authorization is received, regulatory and licensing integration and coordination, and support for participation in the licensing proceedings
- Support Nuclear Regulatory Commission adoption of the Environmental Impact Statement
- Support management and integration of licensing strategies, identification of requirements inherent in those strategies, development of plans to implement those strategies, and maintenance of traceable documentation of decisions made to implement those strategies

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.23

TITLE: Department of Energy/Spent Nuclear Fuel Plutonium Disposition (DOE/SNF Plutonium Disposition)

OBJECTIVE: Provide support to Department of Energy/Spent Nuclear Fuel plutonium disposition activities.

DESCRIPTION OF WORK: All efforts required to:

- Assess fissile material disposition materials for inclusion in the Site Recommendation for the Monitored Geologic Repository, Monitored Geologic Repository License Application, and License Application update
- Perform studies needed to resolve to be determined/to be verified issues associated with the Department of Energy/Spent Nuclear Fuel
- Conduct intact, degraded, and external criticality risk evaluations for immobilized plutonium waste forms in support of the Site Recommendation
- Develop data sets and update models for the plutonium waste forms needed for the Total System Performance Assessment for License Application
- Develop and update waste acceptance criteria document sections, criticality methodology topical report sections, and interface control document sections

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.23.1

TITLE: Department of Energy Spent Nuclear Fuel (DOE Spent Nuclear Fuel)

OBJECTIVE: Provide support to the Department of Energy Spent Nuclear Fuel disposition.

DESCRIPTION OF WORK: All efforts required to:

- Assess Department of Energy-owned spent nuclear fuel for inclusion in the Site Recommendation for the Monitored Geologic Repository, Monitored Geologic Repository License Application, and License Application update
- Conduct criticality analyses for Department of Energy SNF groups in intact and degraded states, as needed, to support the Site Recommendation, License Application, and License Application update activities.
- Perform studies needed to resolve to be determined/to be verified issues associated with the Department of Energy spent nuclear fuel. Develop data sets and models, as needed, for total system performance assessment analyses.
- Conduct design basis events analyses of the bounding fuel types in support of the surface and subsurface designs for the Site Recommendation, License Application, and License Application update activities.
- Provide general support, as required by the Idaho National Engineering and Environmental Laboratory/NSNFP, to qualify the input data and establish bounding fuel characteristics needed to support the licensing analyses.
- Develop and update waste acceptance criteria document sections, criticality methodology topical report sections, and interface control document sections.
- Plan for the eventual acceptance of Department of Energy-owned spent nuclear fuel at the potential Monitored Geologic Repository

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.23.2

TITLE: Plutonium Disposition

OBJECTIVE: Provide support for fissile material disposition.

DESCRIPTION OF WORK: All efforts required to:

- Assess fissile material disposition materials for inclusion in the Site Recommendation for the Monitored Geologic Repository, Monitored Geologic Repository License Application, and License Application update
- Conduct intact, degraded, and external criticality risk evaluations for immobilized plutonium waste forms in support of the Site Recommendation
- Update the EQ3/6 model algorithms and thermodynamic data, as needed, to evaluate plutonium waste forms
- Develop data sets and update models for the plutonium waste forms needed for the Total System Performance Assessment for License Application
- Conduct design basis events analyses of plutonium waste forms for off-normal operations and accidents
- Develop and update waste acceptance criteria document sections, criticality methodology topical report sections, and interface control document sections
- Plan for the eventual acceptance of fissile material disposition materials at the potential Monitored Geologic Repository

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project Work Breakdown Structure Dictionary

WBS: 1.2.30

TITLE: Monitored Geologic Repository

OBJECTIVE: After License Application submittal, design, procure, and construct a Monitored Geologic Repository to isolate commercial spent nuclear fuel, Department of Energy spent nuclear fuel, and other high-level nuclear waste from the accessible environment.

DESCRIPTION OF WORK: All efforts required to:

- Engineer, procure, and construct surface facilities for an Monitored Geologic Repository
- Engineer, procure, and construct subsurface facilities for an Monitored Geologic Repository
- Engineer, procure, and fabricate waste packages and auxiliary systems
- Engineer, procure, and construct Nevada rail transportation system
- Procure, and construct offsite utility systems

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.30.1

TITLE: Regulatory, Infrastructure and Management Support (Regulatory, Infrastructure & Management Sup)

OBJECTIVE: After securing a Construction Authorization, provide the necessary regulatory, environmental, safety and health, information management, safeguards and security, quality control, project control, training, institutional affairs, and administrative support services to complete the engineering, procurement, and construction of a Monitored Geologic Repository. Starting from License Application Submittal, provide the necessary work to refine and maintain an integrated safety analysis for the Monitored Geologic Repository design, refine and maintain the test and evaluation plan and it's subtier documents, implement the integrated systems testing and evaluation, and maintain the systems interface control documents.

DESCRIPTION OF WORK:

- Regulatory
- Environmental, Safety and Health
- Information Management
- Safeguards and Security Services
- Quality Control
- Project Control
- Training
- Institutional Affairs
- Administrative Support Services

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.30.2

TITLE: Surface Structures

OBJECTIVE: Provide facilities to receive, handle, and package spent nuclear fuel and high-level waste, and place the waste packages onto repository transport vehicles.

DESCRIPTION OF WORK: All efforts after License Application submittal required to:

- Engineer, design, procure, and construct all repository surface facilities. These include the Waste Handling Building, the Waste Treatment Building, the Carrier Preparation Building, the Transporter Maintenance Building, Airlock Building, and all associated systems and components, as well as other supporting and auxiliary buildings (balance of plant), and their associated systems and components required to receive, handle, and package spent nuclear fuel and high-level waste, and place the waste packages onto repository transport vehicles

- Design, procure, construct, and test prototype systems and components, as necessary, to ensure development of integrated, fully functional systems

- Design, procure, and construct all necessary on-site, surface utility systems and transportation systems required to support the surface and subsurface functions and missions

- Provide all Yucca Mountain surface facility management support services. Surface facility management services include all surface facility design and procurement management, construction management and integration, surface operations logistics support, surface facility and system maintenance management, as well as surface prototype test facilities management, operations, and maintenance

CR:
APPROVED:
REV: 00

Yucca Mountain
Monitored Geologic Repository
Work Breakdown Structure Dictionary

WBS: 1.2.30.3

TITLE: Subsurface Structures

OBJECTIVE: Provide waste package transport vehicles and underground facilities to transport, emplace, ventilate, and monitor spent nuclear fuel and high-level waste packages in an Monitored Geologic Repository, to safely isolate the waste from the accessible environment.

DESCRIPTION OF WORK: All efforts after License Application submittal required to:

- Engineer, design and procure waste package transport and emplacement related equipment. These include the Waste Package Transporter, Emplacement Gantry, Gantry Carrier, and Transport Locomotive, and all associated systems and components required to transport and emplace the waste packages

- Engineer, design, procure, and construct all repository subsurface access mains, emplacement drifts, performance confirmation drifts, alcoves and niches, ventilation shafts and tunnels, as well as all other supporting and auxiliary systems and components required to emplace, ventilate, and monitor the waste packages in an Monitored Geologic Repository

- Design, procure, construct, and test prototype systems and components, as necessary, to ensure development of integrated, fully functional subsurface Monitored Geologic Repository systems

- Design, procure, and construct all necessary underground utility systems and transportation systems required to support the subsurface functions and mission

- Provide all Yucca Mountain subsurface management support services. Subsurface management services include all underground design and procurement management, construction management and integration, underground operations logistics support, underground facility and system maintenance management, and underground Monitored Geologic Repository systems prototype test facilities management, operations, and maintenance

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.30.4

TITLE: Waste Package and Supports

OBJECTIVE: Provide waste packages for all waste forms to support licensing, packaging, and emplacement in an Monitored Geologic Repository to safely isolate the waste from the accessible environment.

DESCRIPTION OF WORK: All efforts after License Application submittal required to:

- Engineer, design, develop, and procure waste packages and auxiliary systems and components to facilitate safe isolation of:
    - Commercial spent nuclear fuel
    - Department of Energy-owned spent nuclear fuel
    - Defense high-level waste glass canisters
    - Immobilized plutonium waste canisters
    - Navy nuclear fuel canisters
- Design, procure, fabricate, and test prototype waste package systems and components, as necessary, to ensure development of integrated, fully functional Monitored Geologic Repository waste packages and auxiliary systems
- Provide all waste package system management support services. Waste package system management services include all waste package design and procurement logistics support, fabrication management and integration, waste package system management, as well as waste package prototype test facilities management, operations, and maintenance.

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.30.5

TITLE: Nevada Transportation

OBJECTIVE: Provide all physical structures and systems required to accommodate transport of spent nuclear fuel and high-level waste from the Nevada transfer stations to the MGR entrance security station.

DESCRIPTION OF WORK: All efforts after License Application submittal required to:

- Engineer, design, procure, and construct all rail and highway transportation systems required within Nevada to provide waste cask transport to the Monitored Geologic Repository entrance security station

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.30.6

TITLE: Performance Confirmation

OBJECTIVE: Provide data, where practicable, that:1) indicate whether actual subsurface conditions encountered and changes in those conditions during construction and waste emplacement operations are within the limits assumed in the licensing review, 2) indicate whether geologic and engineered systems and components required for repository operation, and that are designed or assumed to operate as barriers after permanent closure, are functioning as intended and anticipated, 3) confirm the adequacy of the design, and 4) will be used to resolve safety questions associated with the engineered and natural barriers important to waste isolation.

DESCRIPTION OF WORK: All efforts after Construction Authorization required to:

- Refine and maintain as necessary the Performance Confirmation plan for site and laboratory testing to achieve the objectives of the Performance Confirmation program as required by Nuclear Regulatory Commission regulations

- Refine and maintain as necessary the Research and Development plan to confirm the adequacy of the design and to resolve any safety questions related to the engineered and natural barriers important to waste isolation

- Provide technical support for test design, equipment and instrument procurement, test set-up, instrumentation calibration

- Provide technical support for test data reduction and analysis, confirmation analyses, and reporting

- Provide test and test facility management, operations, and maintenance support

CR:
APPROVED:
REV: 00

Yucca Mountain Site Characterization Project
Work Breakdown Structure Dictionary

WBS: 1.2.30.7

TITLE: Off-Site Utilities and Physical Infrastructure

OBJECTIVE: Provide all physical structures, systems, and components required to deliver necessary utilities to the MGR and the off-site transportation systems.

DESCRIPTION OF WORK: All efforts after License Application submittal required to:

- Procure the off-site delivery structures and systems to provide the needed utilities to the Monitored Geologic Repository site. The necessary utilities include:

- Procure and construct necessary utilities systems for the off-site transportation systems and the inter-modal transfer station

CR:
APPROVED:
REV: 00